M900 Series Modular Multi-Axis Bus Servo User Manual R1.3

Company Profile

MT Drive & Control (Shenzhen) Co., Ltd. is a national high-tech enterprise specializing in core components and complete solutions for advanced manufacturing. The company adheres to the principle of “deep cultivation of the industry and focus on innovation” and has built a three-layer industrial control product architecture covering control, servo, and sensor products. We are committed to providing more advanced, reliable, efficient, and competitive complete industry solutions.

Headquartered in Shenzhen, China’s innovation hub, the company has an R&D center, production center, marketing center, administrative center, and Suzhou branch. As a pioneer and leader in multi-axis transmission, MT Drive offers PLCs, servo systems, integrated drive-control systems, remote I/O modules, and other products supporting bus protocols such as EtherCAT, PROFINET, and EtherNet/IP. With a unique technical architecture and excellent performance, its products are widely used in photovoltaics, lithium batteries, robotics, CNC machine tools (metal, woodworking, and glass), semiconductors, logistics and warehousing, 3C electronics, automotive manufacturing, printing and packaging, tobacco, and other industries. MT Drive adheres to long-term value orientation and develops products and solutions in parallel. As its product line becomes increasingly diverse, the company will provide comprehensive services to the industrial sector and actively promote industry development.

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Revision History

Revision Date	Release	Changes
2023-10	R1.0	Initial release
2024-05	R1.1	● Revise the wiring diagram for "5.2.5 Drive Module Control Circuit Terminal (CN1) DI/DO Wiring" on page 32 ● Revise the "Function Codes" throughout Chapter 7 ● New power module PU35 ● Other minor revisions
2024-12	R1.2	● Other minor revisions
2025-08	R1.3	● Add an explanation of the alarm content

Contents

Chapter I Safety Information and Precautions

In this manual, Safety warning signs are defined as follows:


Indicates precautions in operation.


Indicates that failure to operate as required may cause moderate personal injury or property damage.


Indicates that failure to operate as required may cause serious damage to the equipment or personal injury.

1.1Safety Information

1.1.1 Before and during installation

- Do not use the servo drive with damaged or missing parts, otherwise it may cause personal injury, fire or other accidents.
- Please use the motor with Class B or above insulation, otherwise there is a risk of electric shock.
- It is forbidden to install the servo drive on flammable materials, otherwise there is a fire risk.

1.1.2 Wiring

- The construction shall be carried out by professional electrical engineering personnel, otherwise there is a risk of electric shock.
- There must be a circuit breaker between the servo drive and the power supply, otherwise a fire may occur.
- Before wiring, please make sure that the power supply is off, otherwise there is a risk of electric shock.
- The grounding terminal must be reliably grounded, otherwise there is a risk of electric shock.

- Do not connect the input power cord to the output terminals U, V and W, otherwise the servo drive may be damaged!
- Make sure that the wiring meets the EMC requirements and the safety standards of the area; as the wire diameter, please refer to the recommendations in the manual, otherwise an accident may occur!

- Do not connect the braking resistor to the DC bus (+ (-) terminal directly, otherwise fire may be caused!

1.1.3 Before Power-on

- Please confirm whether the supply voltage class is consistent with the rated voltage of the servo drive, and whether the wiring positions of the input and output are correct, and note to check for short circuit in the peripheral circuit, and the connected circuit for tightness, otherwise the servo drive may be damaged!
- The servo drive cannot be powered on unless the cover plate is put on, otherwise electric shock may be caused!

1.1.4 After Power-on

- Do not open the cover plate after power on, otherwise there is a risk of electric shock.
- Do not touch the servo drive and peripheral circuit, otherwise electric shock may be caused.
- Do not touch the servo drive terminal (including the control terminal), otherwise there is a risk of electric shock.
- At the beginning of power on, the servo drive automatically carries out safety detection on the external strong current circuit. In this case, do not touch the U, V, W terminals of the servo drive or the wiring terminals of the motor, otherwise there is a risk of electric shock.

- According to different working conditions, it is recommended to adjust the parameters at zero speed or Servo OFF, otherwise the sudden change to speed may be caused, resulting in accidents.
- Do not change the factory parameters of the servo drive at will, otherwise the equipment may be damaged.

1.1.5 During Operation

- During the operation of servo drive, foreign objects shall be prevented from falling into the equipment, otherwise damage to the equipment may be caused.
- Do not use the contactor on-off method to control the start and stop of the drive, otherwise the equipment will be damaged.

- Never repair or maintain the equipment while the power is on, otherwise there is a risk of electric shock.
- Confirm that the servo drive can only be maintained and repaired after the power indicator of the servo drive is completely off, otherwise the residual charge on the

capacitor may cause harm to people.

- Personnel without professional training shall not repair or maintain the servo drive, otherwise personal injury or equipment damage may be caused.

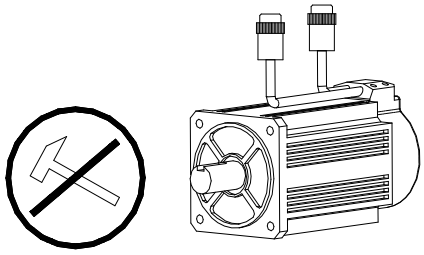
1.2 Precautions

1.2.1 Motor Insulation Inspection

Before the first use, reuse after long-term placement and regular examination of the motor, the motor insulation shall be inspected to prevent the drive from being damaged due to the insulation failure of the motor winding. During the insulation inspection, the motor wiring must be separated from the servo drive. It is recommended to use a 500V voltage type megger to ensure that the measured insulation resistance is not less than 5mΩ.

1.2.2 Motor

It is strictly forbidden to knock any position of the motor, especially the projecting shaft of the motor, as this may cause permanent damage to the motor. Please use a rubber hammer to exert moderate force during the installation process.



1.2.3 Motor Heating and Noise

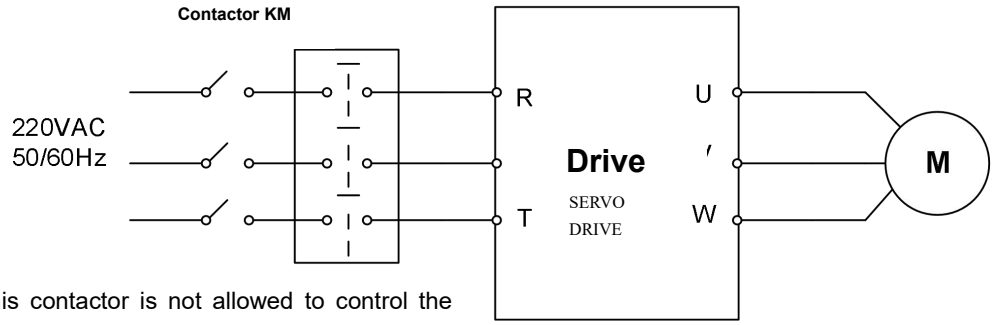
The output voltage of servo drive is PWM wave, which contains certain harmonics, so the temperature rise, noise and vibration of motor may slightly increase compared with power frequency operation.

1.2.4 Use Outside the Rated Voltage

It is not suitable for use outside the allowable working voltage range specified in the manual, as this may easily cause damage to the components in the servo drive. The corresponding step-up or step-down device should be used for voltage transformation if necessary.

1.2.5 Contactors and Other Switching Devices Used at the Input and Output Ends of the Servo Drive

If a contactor is installed between the power supply and the input end of the servo drive, the contactor is not allowed to control the start and stop of the servo drive. When the contactor must be used to control the start and stop of the servo drive, the interval shall not be less than one hour. Frequent charging and discharging may easily reduce the service life of the capacitor in the servo drive. If there are contactors and other switching devices between the output end and the motor, it is necessary to ensure that the servo drive can perform switching when there is no output, otherwise the module in the servo drive may be damaged easily.

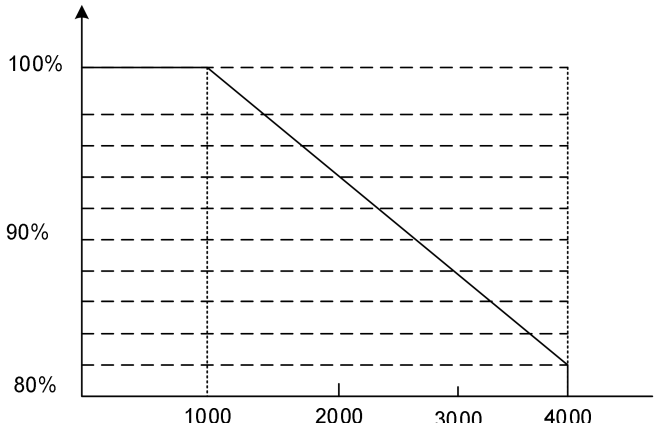


This contactor is not allowed to control the start and stop of the drive. When it must be used, the interval should not be less than 1 hour.

Figure 1-2

1.2.6 Altitude and Derating

As the air in the area with altitude over 1000m is thin, the heat dissipation effect of the servo drive becomes poor, derating must be performed.



Drive rated output current and height derating curve

Figure 1-3

1.2.7 Precautions for Disposal of the Servo Drive

Explosion may take place when the electrolytic capacitor of the main circuit and the electrolytic capacitor on the printed board are burned, and toxic gas will be generated when the plastic parts are burned. They should be treated as industrial waste.

1.2.8 Drive Precautions

When the drive incurs overcurrent Er.002 ~ Er005, Er.009 ~ Er0012 and other faults, and the fault occurs again if it is started again, be sure to make troubleshooting, and do not start frequently for many times, otherwise the drive inverter module may be damaged by the impact of large current.

2. Chapter II Product Information

2.1 Product Features

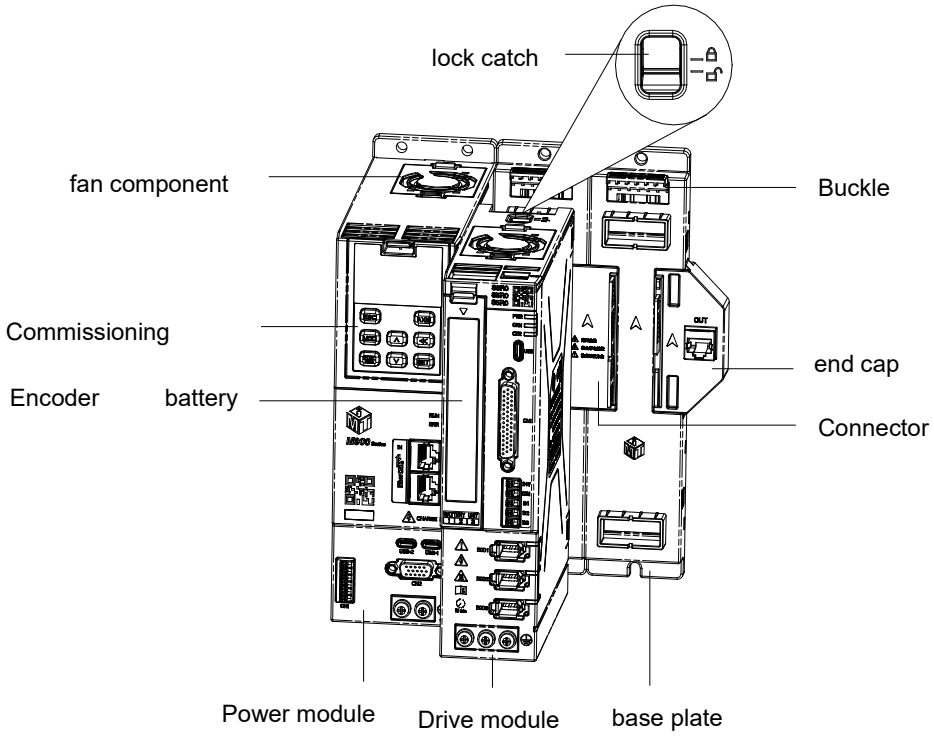
The M900 series multi-axis bus servo drive is a third-generation high-performance bus servo drive developed by MT Drive for multi-axis transmission applications. Compared with the M800 dual-axis product, the M900 series supports three-axis drive modules, reducing volume by 25%–30% while further optimizing product configuration and performance. The M900 series adopts an independent power module and freely combinable three-axis, dual-axis, and single-axis drive modules. Users can select power ratings from 50 W to 3.8 kW and configure servo drives with 1 to 15 axes according to on-site requirements. It supports mainstream communication protocols such as EtherCAT and PROFINET and is widely applicable to various bus applications.

2.2 Product Characteristics

Easy commissioning	Built-in commissioning keypad, PC debugging on the host computer, network debugging and other debugging tools;
Easy installation	Plug-in fan assemblys, detachable commissioning keypad, detachable encoder battery; Direct insertion buckle, easy to disassemble and assemble, easy to maintain, tool-free, screw-free, plug-and-replace, reducing maintenance costs;

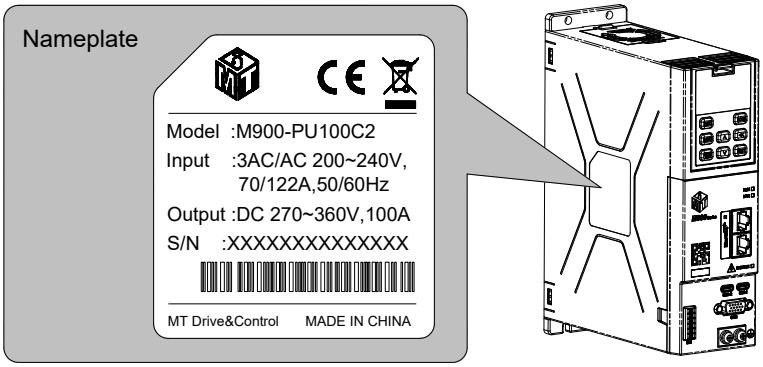
High-speed response	The transmission speed can reach 100 Mbps, and the communication cycle can be as short as 125 us；
Safe and reliable	Built-in STO safe torque off function; IP40 high protection independent air duct, excellent EMC performance；
Service life	24-hour work schedule, up to 11 years+； 12 hour work schedule, up to 20 years+；
Mainstream communication	Support mainstream EtherCAT and PROFINET bus communication protocols.

2.3 Product Components



2.4 Naming Rules

Power module



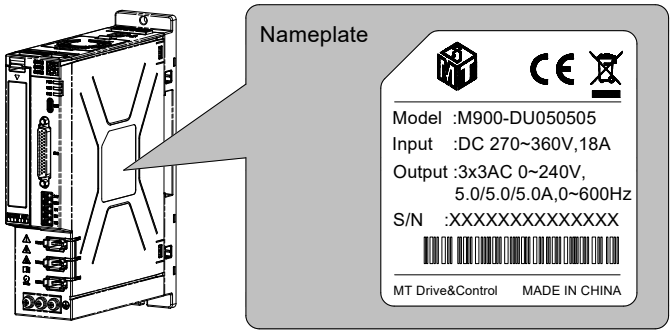
M900-PU100C1

Sign	Product Description
M900-PU	European standard power module
M930-PU	Single power module
. . .	Other series of power modules

Sign	Description
35	Power capacity 35A
50	Power capacity 50A
100	Power capacity 100A

Sign	Description
Default	No motion control components
C1	16 axis motion control component
C2	32 axis motion control component
C3	64 axis motion control component

Drive module



2.5 Power Module Selection

Module model	Power supply capacity	Notes
M900-PU35	35A	INPUT:single phase AC 220 V OUTPUT:35A/310 V DC
M900-PU50	50A	INPUT:single phase / three-phase AC 220 V OUTPUT:50A/310 V DC
M900-PU100	100A	INPUT:single phase / three-phase AC 220 V OUTPUT:100A/310 V DC
M900-PU35C1	35A	INPUT:single phase AC 220 V OUTPUT:35A/310 V DC （Contains 16 axis motion control components）
M900-PU35C2	35A	INPUT:single phase AC 220 V OUTPUT:35A/310 V DC （Contains 32 axis motion control components）
M900-PU35C3	35A	INPUT:single phase AC 220 V OUTPUT:35A/310 V DC （Contains 64 axis motion control components）
M900-PU50C1	50A	INPUT:single phase / three-phase AC 220 V OUTPUT:50A/310 V DC （Contains 16 axis motion control components）
M900-PU50C2	50A	INPUT:single phase / three-phase AC 220 V OUTPUT:50A/310 V DC （Contains 32 axis motion control components）
M900-PU50C3	50A	INPUT:single phase / three-phase AC 220 V OUTPUT:50A/310 V DC （Contains 64 axis motion control components）
M900-PU100C1	100A	INPUT:single phase / three-phase AC 220 V OUTPUT:100A/310 V DC （Contains 16 axis motion control components）
M900-PU100C2	100A	INPUT:single phase / three-phase AC 220 V OUTPUT:100A/310 V DC （Contains 32 axis motion control components）
M900-PU100C3	100A	INPUT:single phase / three-phase AC 220 V OUTPUT:100A/310 V DC （Contains 64 axis motion control components）

2.6 Drive Module Selection

Module Type	specifications	sign	Adaptive power
Three-axis module	M900-DU050505	S5R0、S5R0、S5R0	Reference single-axis module for power range
Dual-axis module	M900-DU1505	S015、S5R0	Reference single-axis module for power range
	M900-DU0808	S8R0、S8R0	
	M900-DU0805	S8R0、S5R0	
	M900-DU0505	S5R0、S5R0	
Single-axis module	M900-DU15	S015	1.8 kW~3.8kW
	M900-DU08	S8R0	850W~1.5kW
	M900-DU05	S5R0	50W~750W

3. Product Specifications

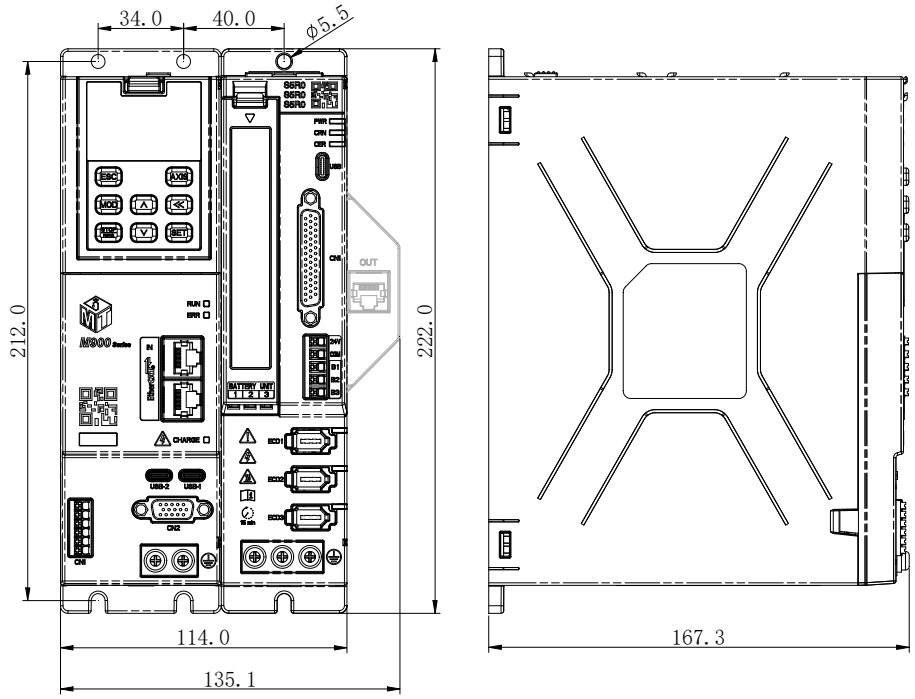
3.1 Technical Specifications

Project		specifications
Basic function	power supply	single-phase/three-phase AC 220 V (wide voltage range: AC 155 V–250 V) 50/60 Hz Note: When the total rated current of multi-axis output exceeds 20A, it is recommended to use three-phase AC 220 V power supply
	Control modes	include position, speed mode, torque mode, and hybrid control mode
	Maximum torque	Max 300%
	Output frequency	0~600Hz
	Current loop period	62.5 us
	Overload capacity	150% rated current output for 100s; 300% rated current output for 3s
Protection function	Protection function	Dynamic braking, overload, overcurrent, short-circuit, overvoltage, undervoltage, overheating, output phase loss, etc
Bus	EtherCAT	EtherCAT protocol (DS402) synchronization cycle 125 us~32ms
	PROFINET	PROFINET protocol (RT) communication cycle 1ms
Environment	Environmental temperature	usage temperature: -10 ℃~+40 ℃ (40 ℃~50 ℃, please reduce the rating for use)
	Storage temperature	-20℃~60℃
	Humidity	<90% RH, no condensation
	Protection level	IP40
	Vibration	0.5 G（4.9m/s²）
	Altitude	Below an altitude of 1000m (>1000m, please use with reduced rating)
	Other	1. Indoor, not exposed to direct sunlight;
		2. No strong electric field, strong magnetic field, radiation, etc;
		3. No corrosive or flammable gases, no splashing of water, oil, or drugs;
		4. No dust, salt or metal dust.

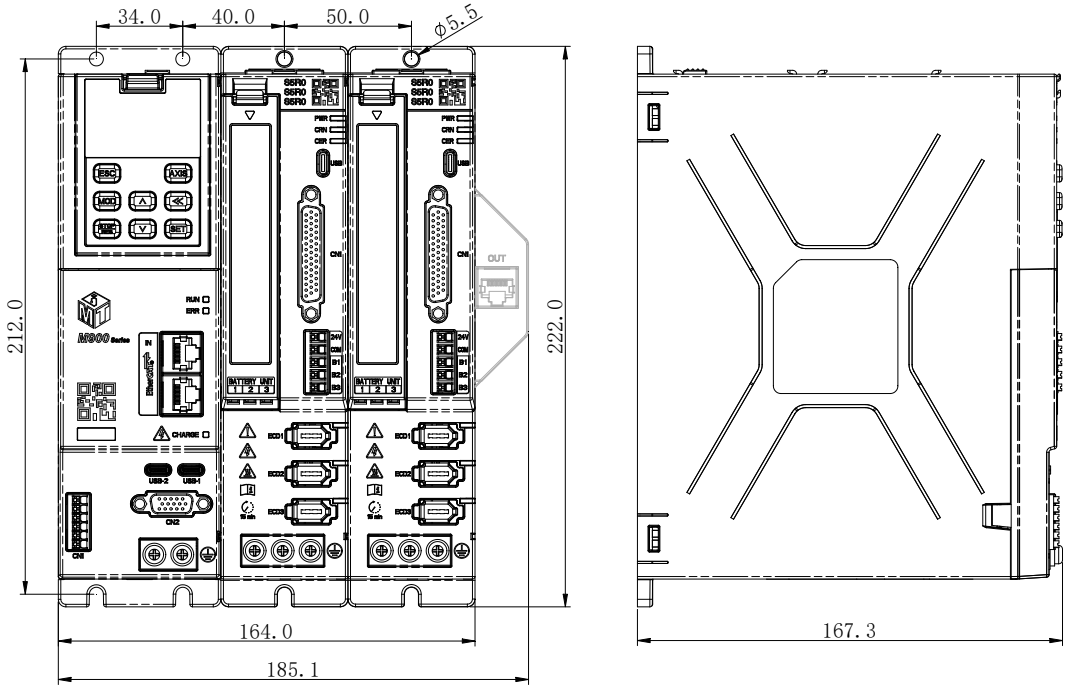
4. Installation and Disassembly

4.1 Appearance and Installation Dimensions

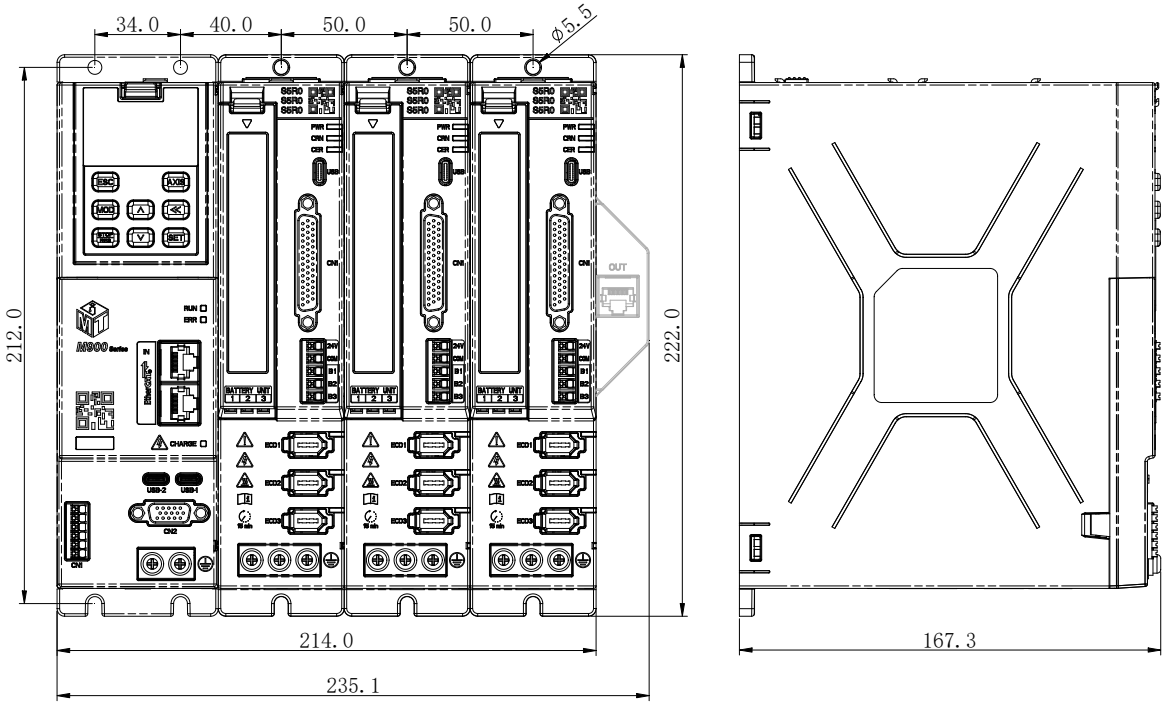
4.1.1 External Dimensions of the Drive



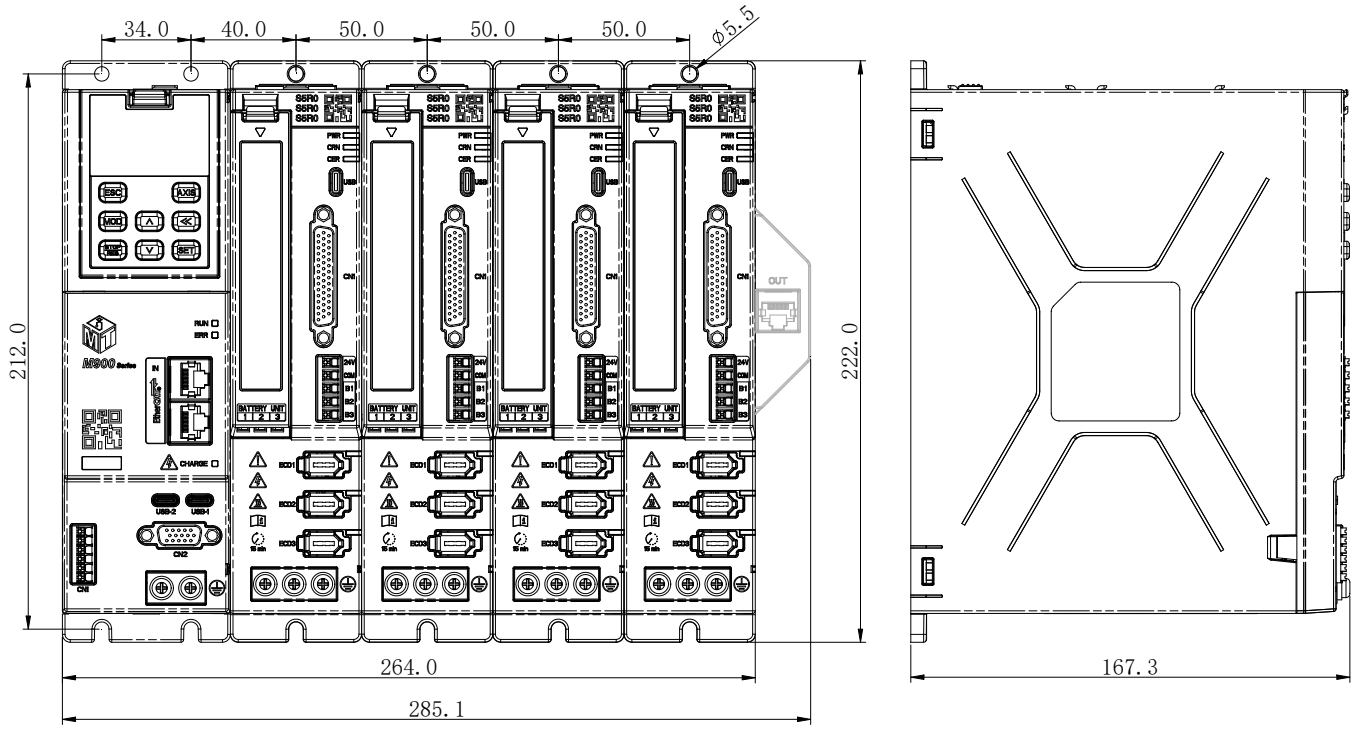
4~6 axes



7~9 axes



10~12 axes



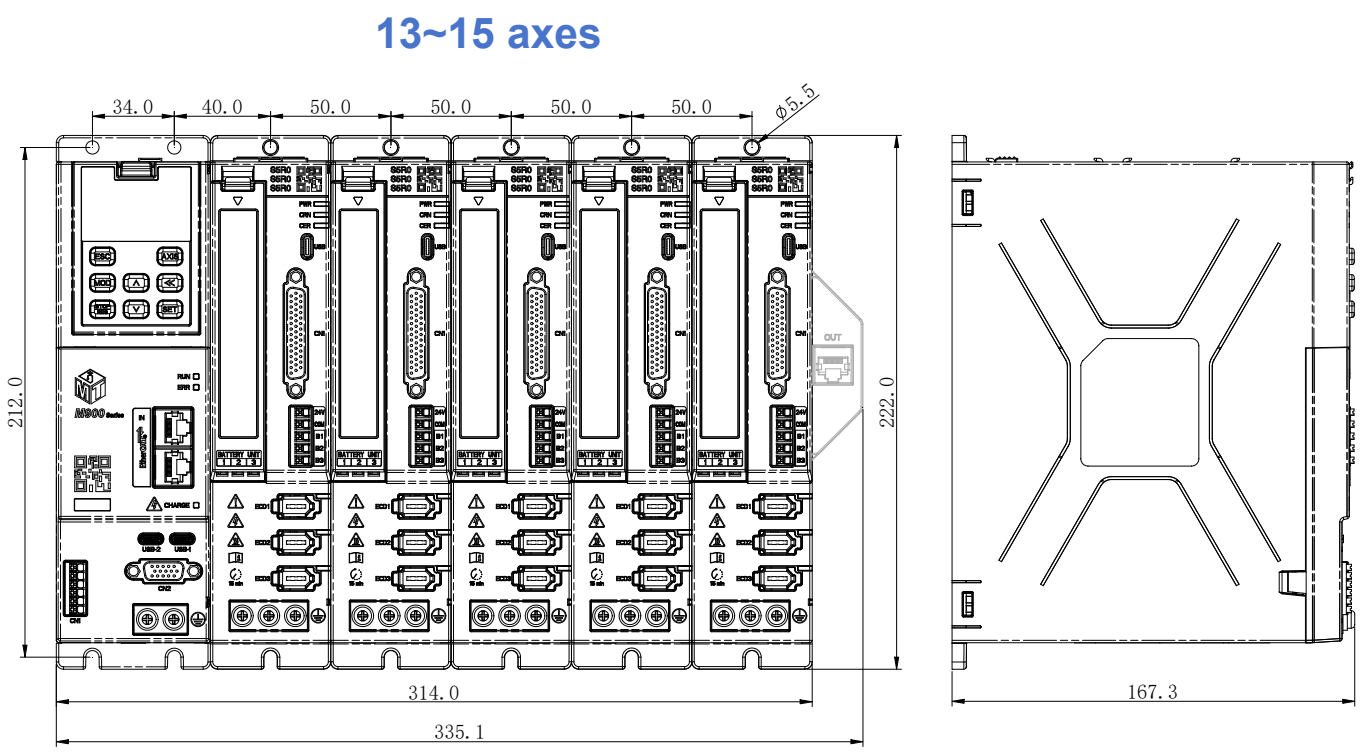


Figure 4-1 External dimensions of servo drive

4.1.2 Installation Distance Requirements for Drives

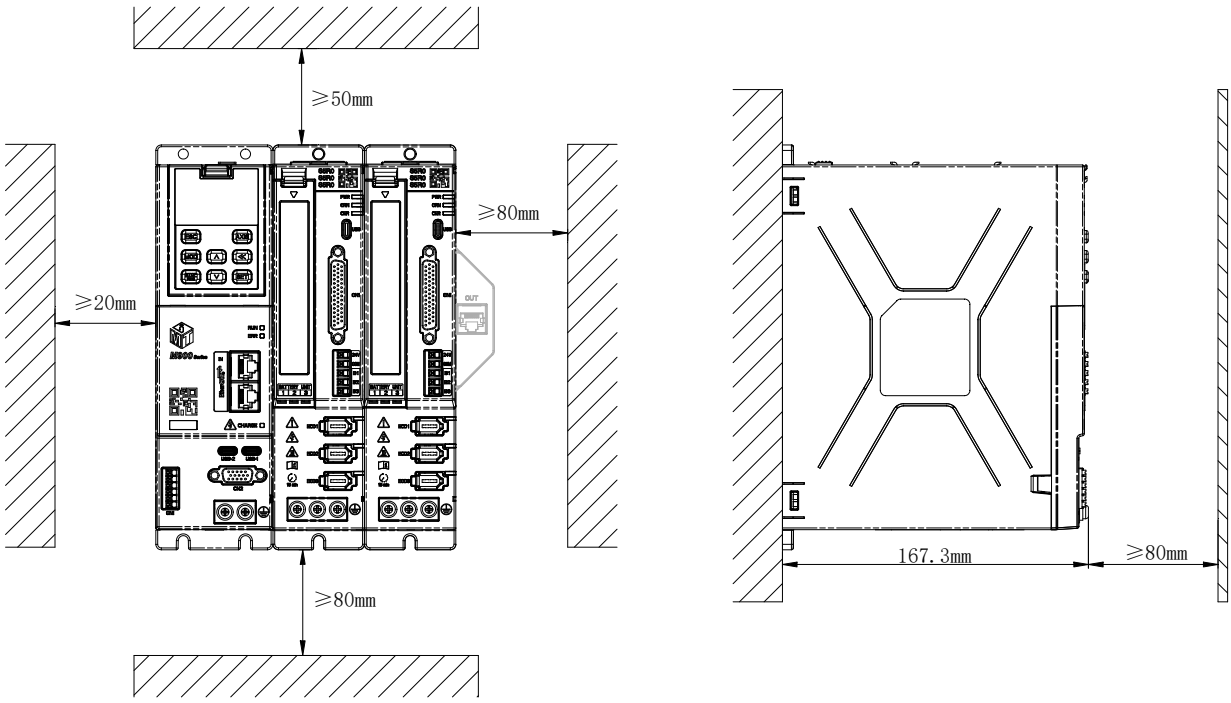


Figure 4-2 Installation distance requirements for servo drives

4.2 Install Drive Module

4.2.1 Installation Sequence of Drive Modules

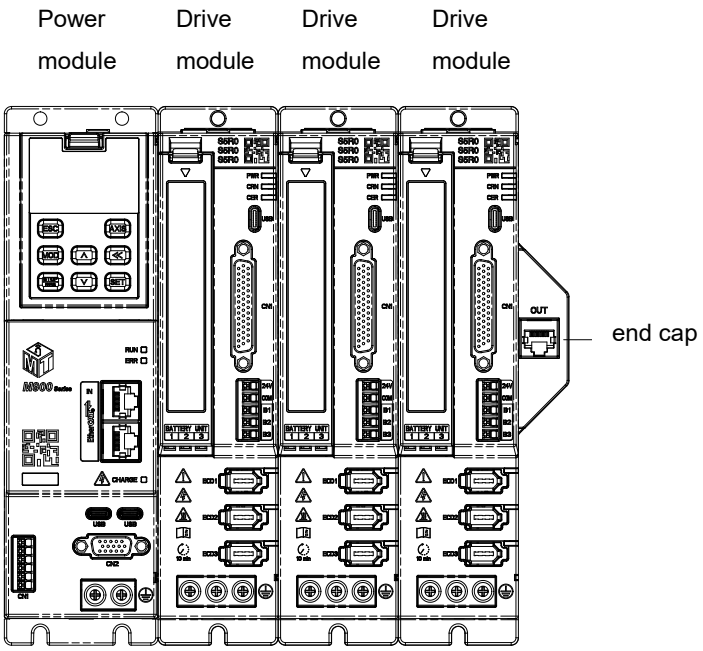


Figure 4-3 Installation sequence of servo drive module

4.2.2 Installation Steps for Drive Module

⚠ Electric shock hazard: To avoid the risk of electric shock, it is strictly prohibited to operate while power is applied when installing the drive module！

Install all modules of the servo drive according to the following steps:

1. As shown in Figure 4-4, insert the first connector into the slot at the bottom of the power module, Until the step surface of the connector is tightly attached to the bottom of the slot, pay attention to the correct direction of the connector when inserting。

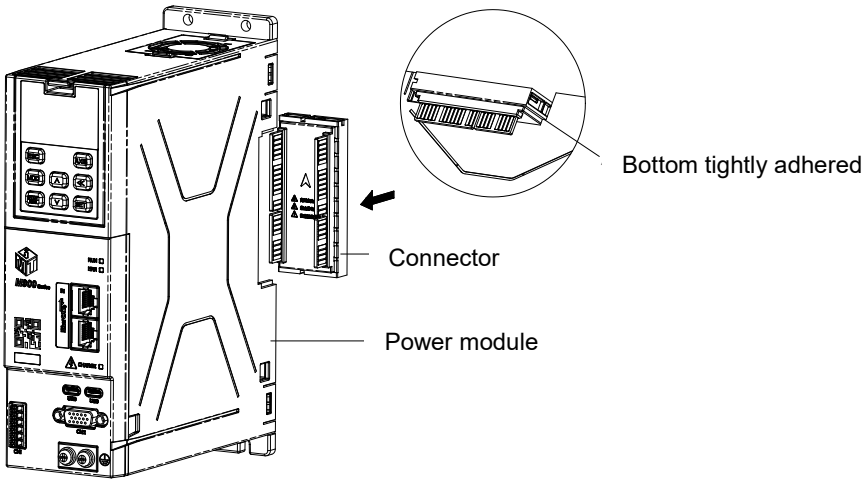


Figure 4-4 Insert the power module into the connection socket

2. As shown in Figure 4-5, insert the first baseplate from the right side of the power module until the left side of the baseplate is tightly attached to the right side of the power module. When inserting, pay attention to the correct direction of the baseplate. After completing the above actions, insert the second connector from the right side until it is tightly attached to the slot on the bottom plate. When inserting, pay attention to the correct direction of the connector.

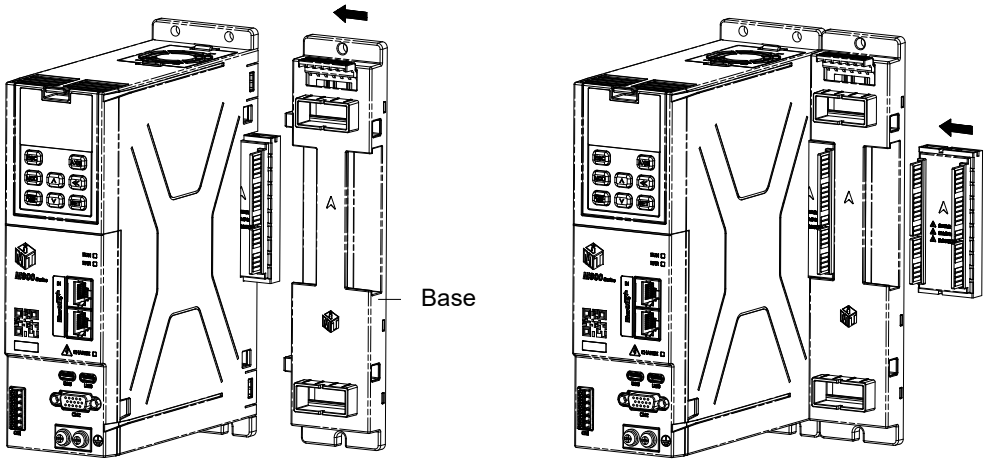


Figure 4-5 Install the baseplate and connector

3. As shown in Figure 4-6, repeat step 2 above. After installing all the baseplates and connection sockets, insert the end cover into the slot on the right side of the rightmost baseplate and make it tightly adhere to the slot.

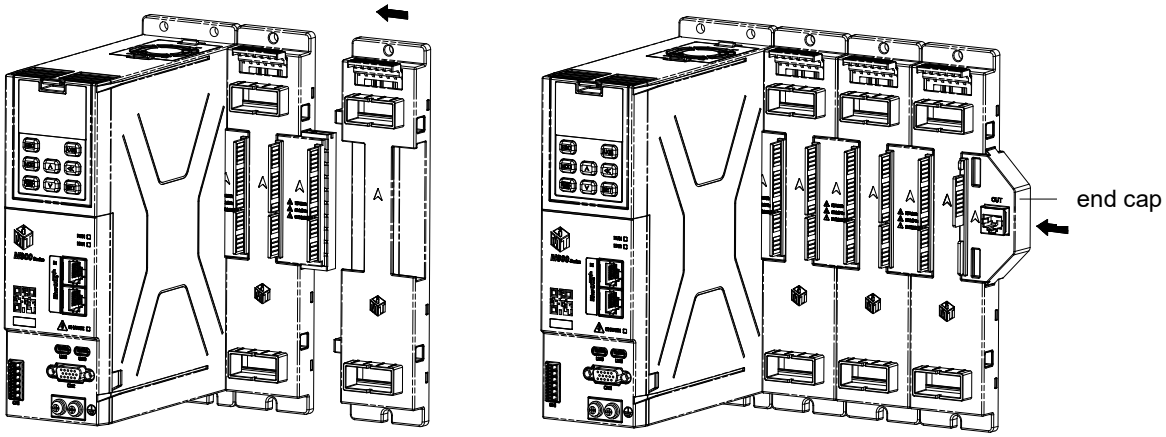


Figure 4-6 Complete the installation of the baseplate, connector, and end cover

4. As shown in Figure 4-7, move the lock buckle at the top of the drive module to the "unlocked" position and align it with the baseplate. Insert it vertically into the baseplate from the front. When the buckle on the top surface of the bottom plate returns to its original position and makes a "click" sound, the drive module is inserted into place. Then move the lock buckle at the top of the drive module to the "locked" position. Using the same method, insert all drive modules into place and lock them securely.

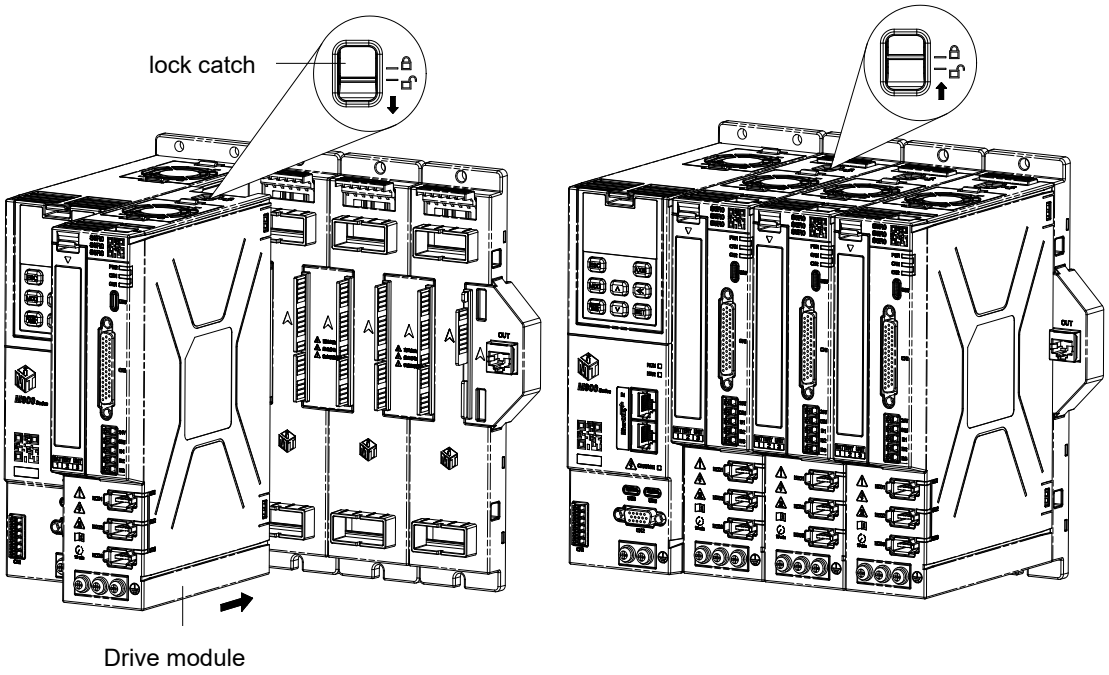


Figure 4-7 Install drive module

4.3 Disassemble the Drive Module

Electric shock hazard: To avoid the risk of electric shock, it is necessary to ensure that the drive is powered off and the power indicator light is turned off before disassembling the drive module!

4.3.1 Disassembly Steps of the Drive Module

Follow these steps to disassemble the drive module of the servo drive:

1. As shown in Figure 4-8, move the lock buckle on the top of the drive module to the "unlocked" position, and then press down on the top of the bottom plate until the buckle makes a slight "click" sound and is in a fixed state, indicating that the buckle has been released. At this point, the drive module can be disassembled.

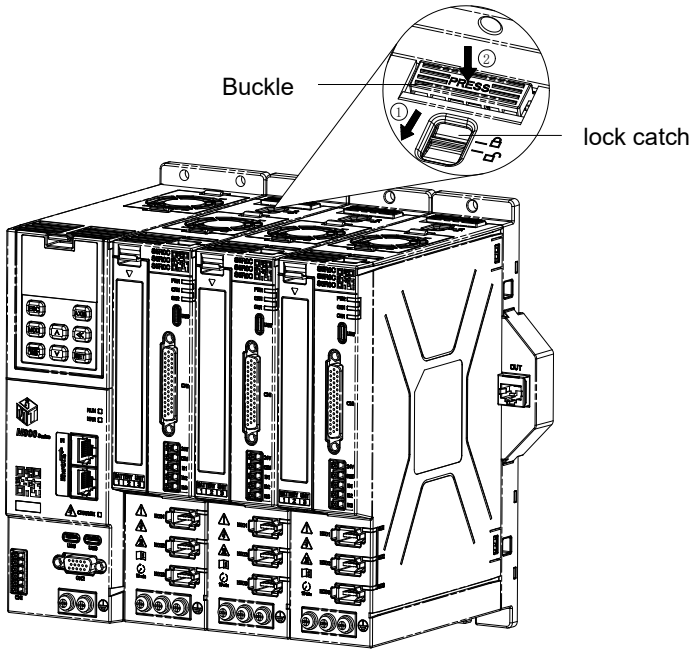


Figure 4-8 Unlock the lock buckle and press the bottom plate buckle

2. As shown in Figure 4-9, hold the front upper and lower sides of the drive module to be disassembled with both hands, and pull it out vertically and outward with force to disassemble the drive module. After disassembling the drive module, the buckle on the bottom plate will automatically return to its original position.

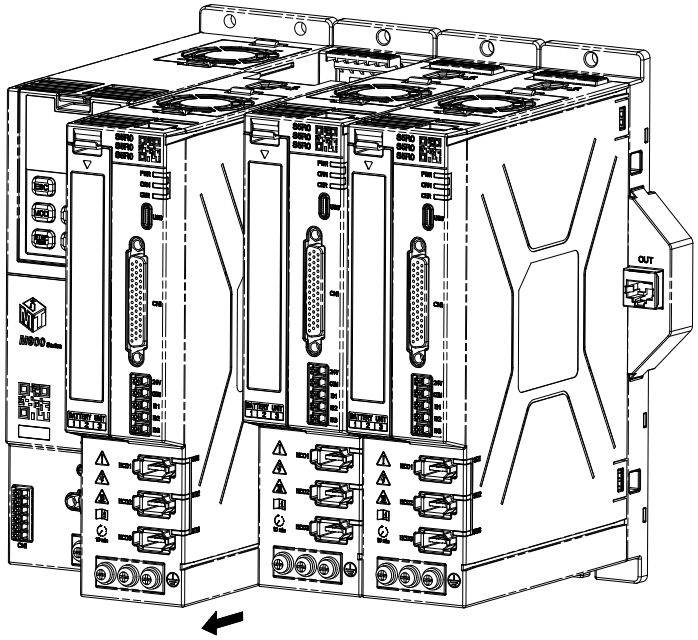


Figure 4-9 Disassemble the drive module

4.3.2 Disassembly Steps of Power Module

Follow these steps to disassemble the power module of the servo drive:

1. According to the above method (Figure 4-9), disassemble the first drive module on the right side of the power module;

2. As shown in Figure 4-10, hold the power module with both hands and pull it out to the left along with the first connector to disassemble the power module.

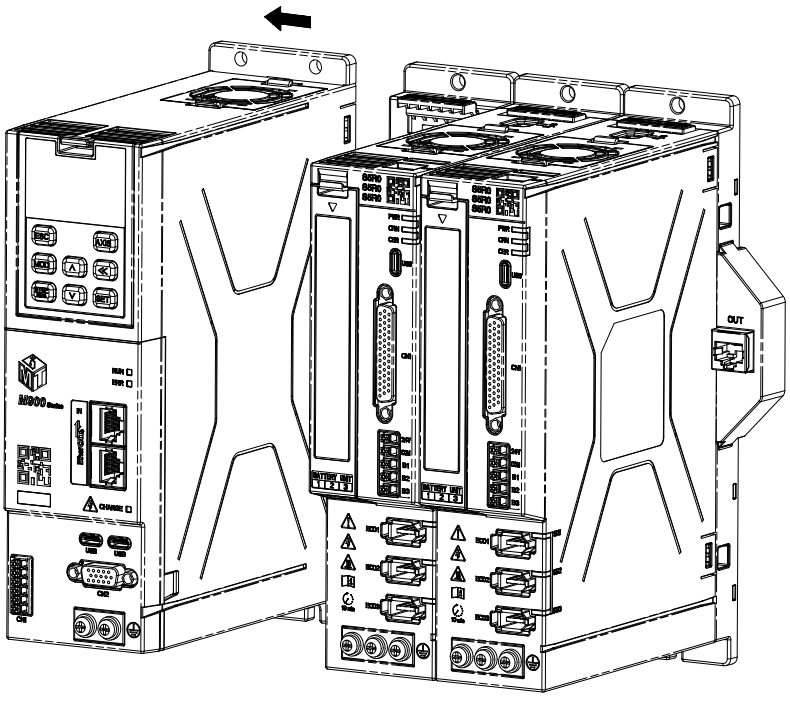


Figure 4-10 Disassemble the power module

4.4 Installation and Removal of Encoder Battery

Attention: The standard battery model is Yiwei ER18505, with a rated voltage of 3.6VDC. If you need to install different types of batteries, please consult our customer service to avoid malfunctions or damage!

4.4.1 Installation of Encoder Battery

Follow these steps to install the encoder battery:

1. As shown in the left figure of Figure 4-11, Lift the battery box cover up from the side of the active buckle(The side with triangular markings on the cover plate),remove the cover plate.
2. As shown in the right figure of Figure 4-11, insert the two battery lead plugs into the corresponding two sockets in the battery box in the positive and negative directions as shown in the diagram, and install the two batteries into the battery box in the direction shown in the diagram.

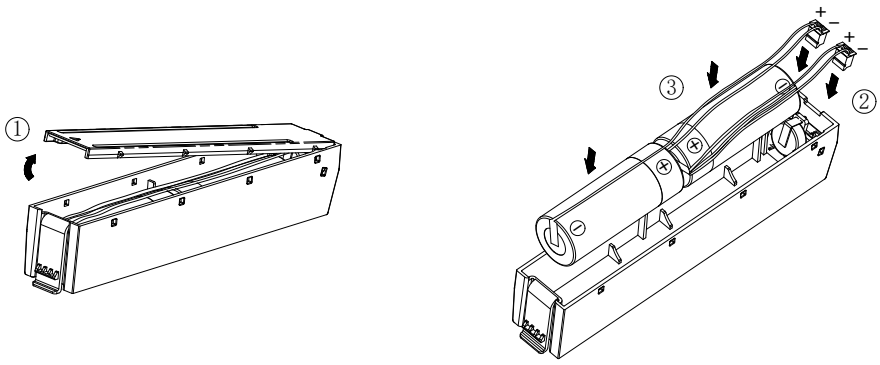


Figure 4-11 Remove the cover plate and install the encoder battery

3. As shown in the left figure of Figure 4-12, organize the battery leads to make them as close to the battery as possible;
4. As shown in Figure 4-12, first press down the battery box cover on one side of the battery lead plug to the corresponding position, and then gradually press down on the other end, so that all the buckles on both sides of the cover are fastened into the corresponding square holes.
5. Installation is complete, as shown in the right figure of Figure 4-12.

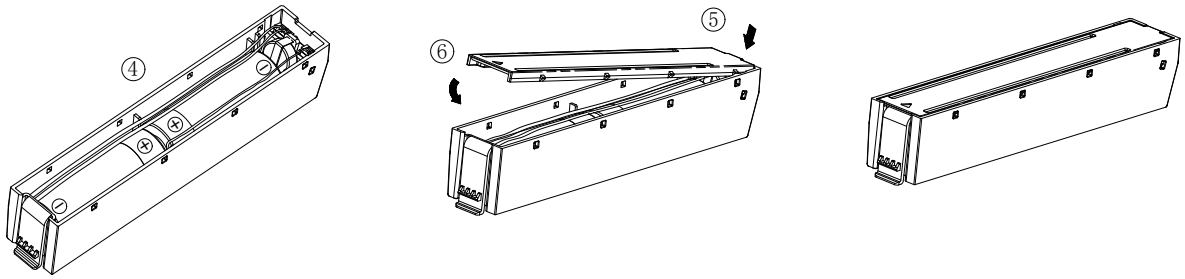


Figure 4-12 Organize battery leads and install cover plate

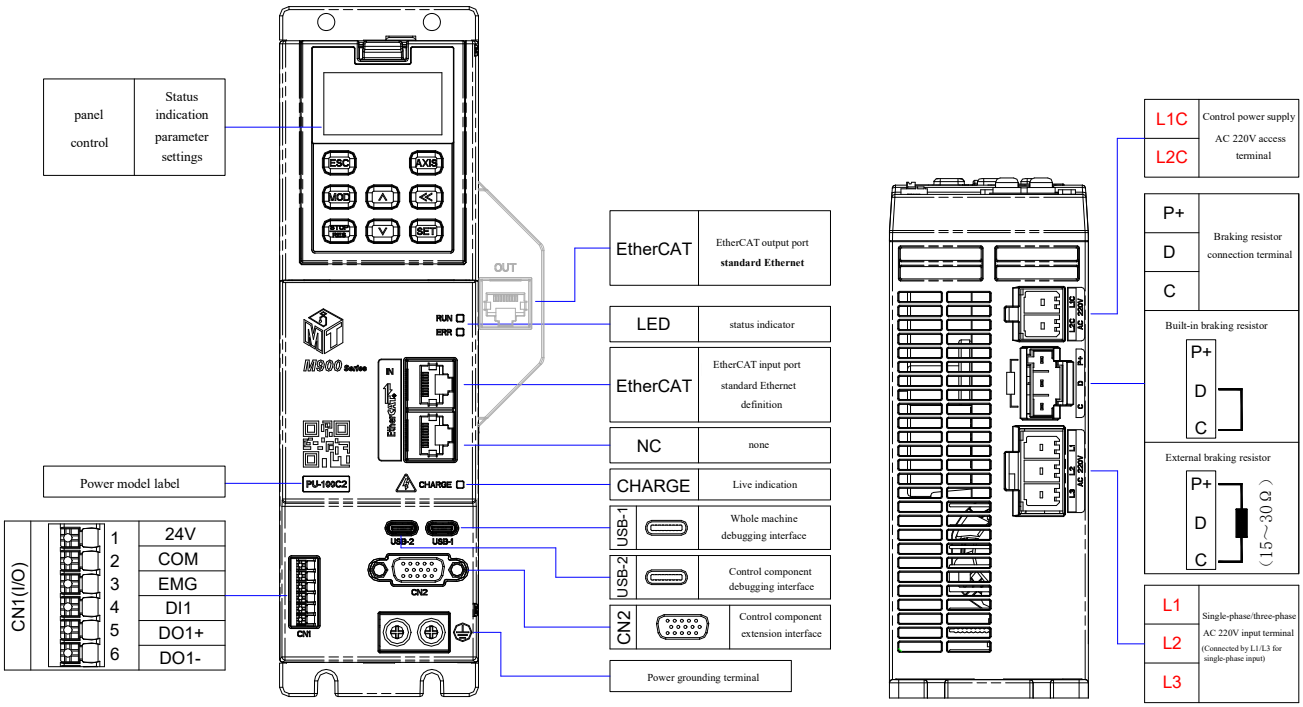
4.4.2 Disassembly of Encoder Battery

To disassemble the encoder battery, follow the reverse steps mentioned above.

5. Wiring Instructions

5.1 Wiring Instructions for Power Module

5.1.1 Definition of Power Module Terminals



Front of power module

Bottom of power module

5.1.2 Power Module Indicator Description

Power module			
Indicator light	**description**	**Indicator light status**	**Indicator light status description**
RUN	running indicator	light off	Not
		light on	The main power supply voltage has reached the working value
		flicker	Brake activated
ERR	fault indicator	light off	Not
		light on	Fault
		flicker	The main power supply voltage has not reached the operating value
CHARGE	Main power indicator light	light off	The main power supply is not supplying power
		light	The main power supply has been powered on

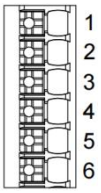
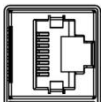
5.1.3 Wiring Instructions for the Main Circuit Terminals of the Power Module

Position	Terminal Identification	Terminal Name	Function Description	Location
Power module	L1C[Note1]	Auxiliary power input terminal	**Single-phase AC 220 V 50/60 Hz power connection terminal**	Power module bottom
	L2C[Note2]			
	P+	brake resistor connection terminal	**brake resistor access terminal** When the braking force is insufficient and an external braking resistor needs to be connected (first remove the short-circuit wire between D and C), connect the braking resistor between P+and C. Recommended resistance value (15-30 Ω); Recommended power (1/5 of the total motor power) **Note: When the resistance value is less than 15 Ω, it will damage the brake circuit**	
	D			
	C			
	L1	three-phase power supply input terminal	**single-phase/three-phase AC 220 V 50/60 Hz(Connected through L1/L3 terminals for single-phase input)**	
	L2			
	L3			
	PE	grounding terminal	**power input grounding**	power module front
	Do not connect the input power cord to the input terminals of the braking resistor (P+, D, C), otherwise it will cause permanent damage to the drive!			

Note 1&Note 2: This terminal is only available in the M900 series, not in other series.

5.1.4 Wiring Instructions for Power Module control circuit terminals

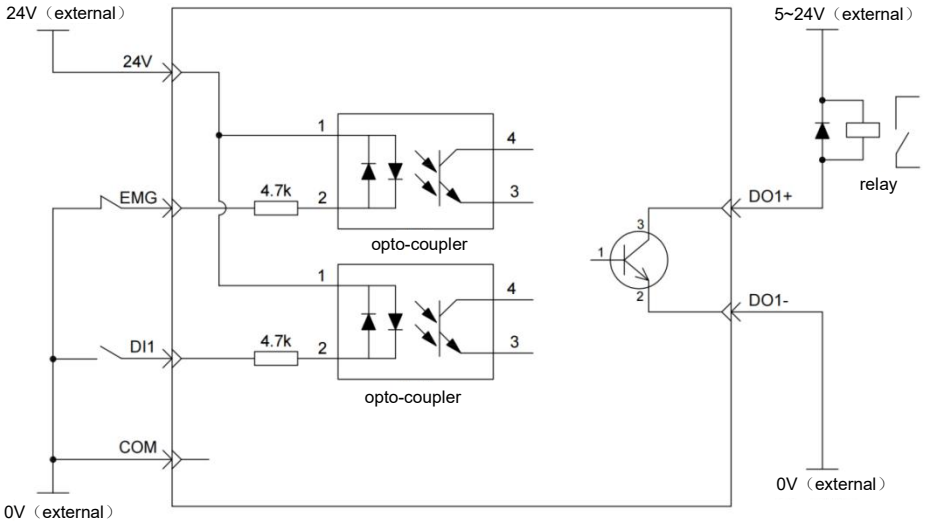
Terminal Name	Function Description	Terminal View	Signal Name	Pin Number	Function
USB1	USB interface		Whole machine debugging interface	TYPE-C USB2.0	/
USB2 注3	USB interface		Control component debugging interface	TYPE-C USB2.0	/
CN2 注4	DB15 interface		Control component teaching pendant interface	/	/

CN1(I/O)	Control terminal		24V	1	**24V input**
			COM	2	**0V input**
			EMG	3	EMG:Emergency stop input (NPN type)
			DI1	4	DI1:Digital input (NPN type)
			DO1+	5	DO1+:Digital output+(NPN type)
			DO1-	6	DO1-:Digital Output - (NPN Type)
EtherCAT	EtherCAT interface		RJ45 standard defines network interface x2	1,2	Please use Super five categories or higher twisted pair shielded Ethernet cable
				3,4	
				5,6	
				7,8	
				shell	

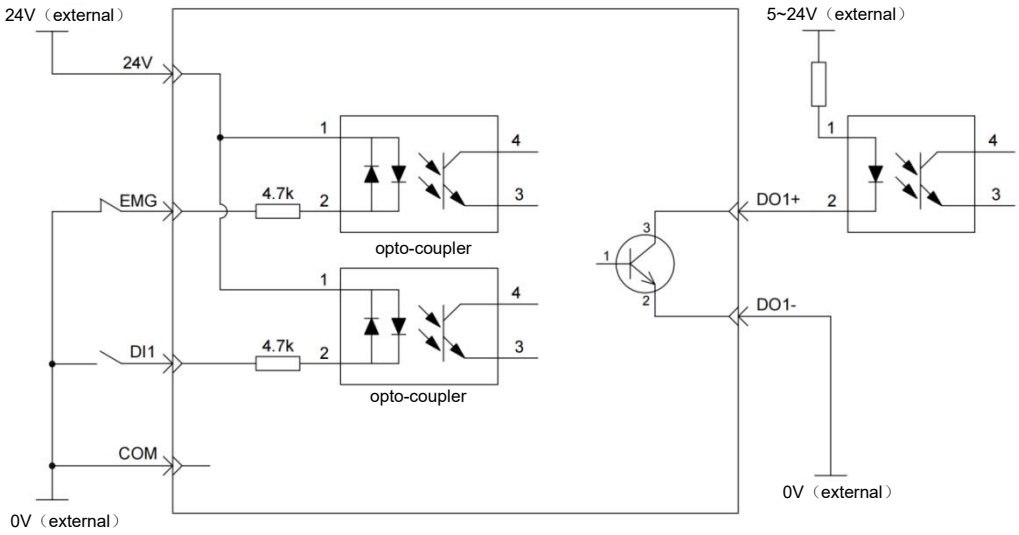
Note 3&Note 4: This interface is only available with optional control components.

5.1.5 Connection of Power Module Control Circuit Terminal (CN1)

- When the upper device is a relay input and an external power source is used:

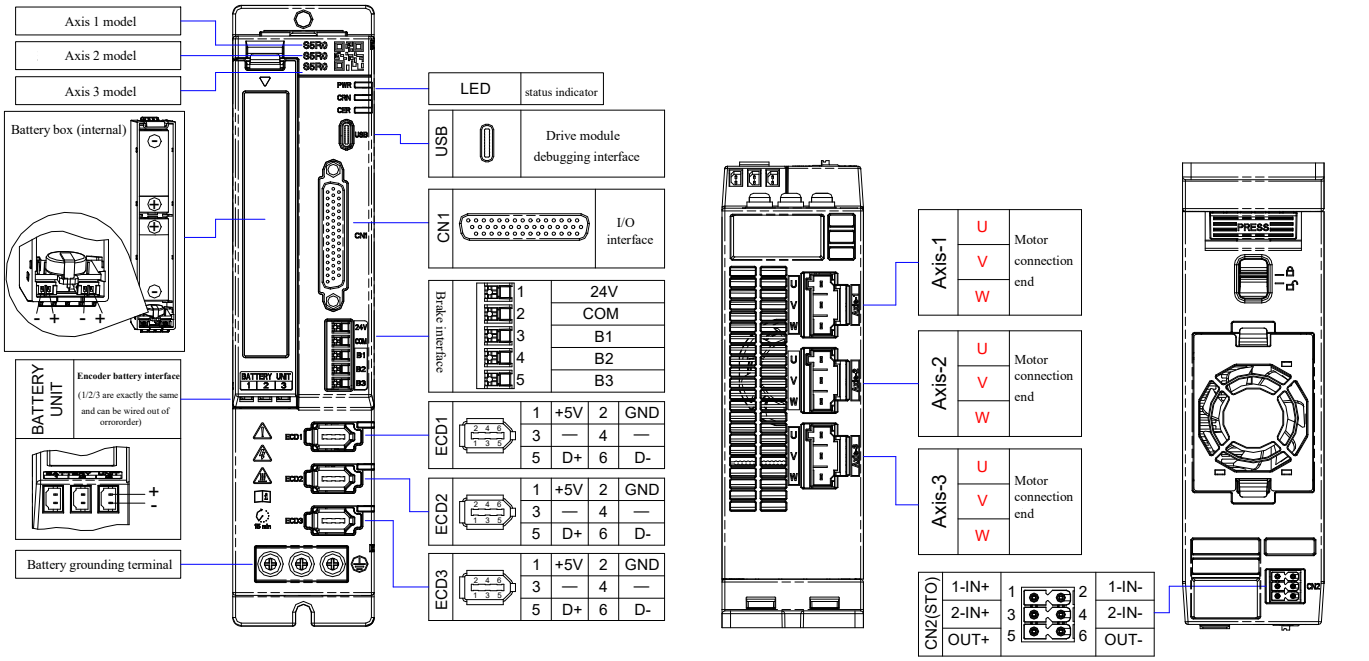


- When the upper device is an optocoupler input and an external power supply is used:



5.2 Wiring Instructions for Drive Module

5.2.1 Definition of Drive Module Terminals



Front of drive module　　Bottom of drive module　　Top surface of drive module

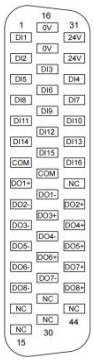
5.2.2 Drive Module Indicator Description

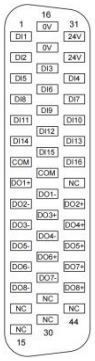
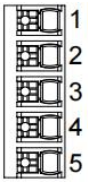
Drive module			
Identification	**Description**	**Indicator Light Status**	**Indicator Light Status Description**
PWR	power indicator	extinguish	the power is not turned on
		bright	The power supply is functioning normally
CRN	communication operation indicator	extinguish	communication status machine:INIT
		200msflicker	communication status machine:PREOP
		Illuminate for 200ms, extinguish for 1s	communication status machine:SAFE-OP
		Light	communication status machine:OP
CER	Communication error indicator light	extinguish	No errors
		flicker	Communication disconnected
ECD1 ECD2 ECD3	Axis 1 status indicator light Axis 2 status indicator light Axis 3 status indicator light	Flashing red light	Axis not ready (check power supply, encoder)
		The red light is always on	Axis malfunction
		Green light flashing	Axis ready but not enabled
		Green light always on	Axis enables in operation

5.2.3 Wiring Instructions for the Main Circuit Terminals of the Drive Module

Position	Terminal identification	Terminal Name	Function Description	Location
Drive module	U	drive power output terminal	**connected to servo motor:** Connect according to the corresponding UVW, otherwise it will cause the motor to not rotate or run faster	Bottom of drive module
	V			
	W			
	PE	grounding terminal	**motor grounding terminal**	drive module front
Warning	Do not connect the input power cord to the U, V, W terminals on the output side, otherwise it will cause permanent damage to the drive!			

5.2.4 Wiring Instructions for Drive Module control circuit terminals

Terminal Name	Function Description	Terminal View	signal name	Pin number	function
USB	USB interface		Debugging and monitoring interfaces	TYPE-C USB2.0	Recommend using TYPE-C cable
CN1	I/O interface		DI1	1	Axis 1 positive limit
			DI2	2	Axis 1 negative limit
			DI3	18	Axis 1 origin
			DI4	33	Axis 1 probe 1
			DI5	3	reserve
			DI6	19	Axis 2 positive limit
			DI7	34	Axis 2 negative limit
			DI8	4	Axis 2 origin
			DI9	20	Axis 2 probe 1
			DI10	35	reserve
			DI11	5	Axis 1 positive limit
			DI12	21	Axis 1 negative limit
			DI13	36	Axis 1 origin
			DI14	6	Axis 1 probe 1
			DI15	22	reserve
			DI16	37	reserve
			COM	7	Digital input public terminal
			COM	23	Digital input public terminal
			DO1+	8	Digital output1+
			DO1-	24	Digital output1-
			DO2+	39	Digital output+
			DO2-	9	Digital output2-
			DO3+	25	Digital output3+
			DO3-	10	Digital output3-
			DO4+	40	Digital output4+
			DO4-	26	Digital output4-

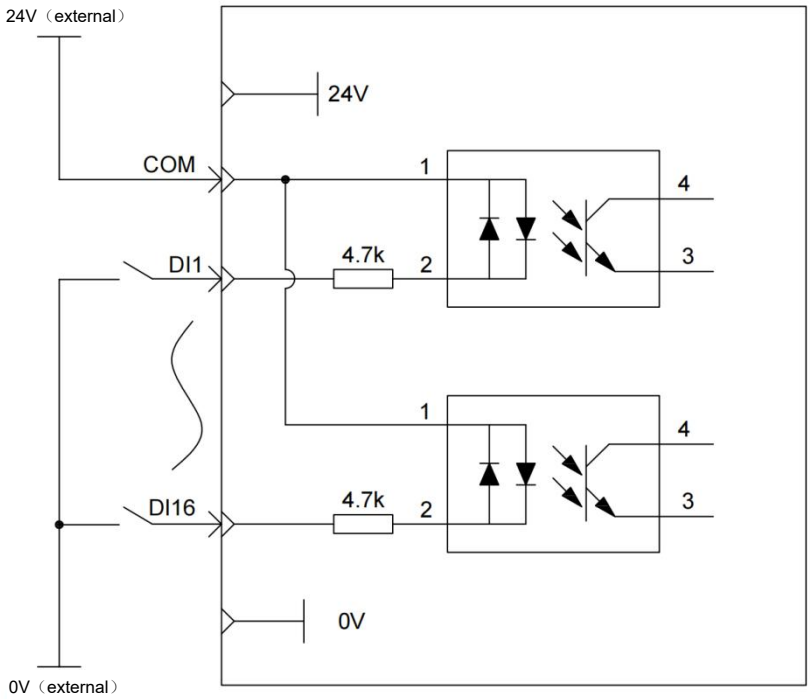
CN1	I/O interface		DO5+	41	Digital output5+
			DO5-	11	Digital output5-
			DO6+	27	Digital output6+
			DO6-	12	Digital output6-
			DO7+	42	Digital output7+
			DO7-	28	Digital output7-
			DO8+	43	Digital output8+
			DO8-	13	Digital output8-
			24V	31	24V output terminal: 200mA (optional)
			24V	32	24V output terminal: 200mA (optional)
			0V	16	0V output terminal: 200mA (optional)
			0V	17	0V output terminal: 200mA (optional)
Brake Interface	Brake control		24V	1	Motor brake control 24V input
			COM	2	Motor brake control 0V input
			B1	3	Axis 1 motor brake control output
			B2	4	Axis 2 motor brake control output
			B3	5	Axis 3 motor brake control output
ECD1	Module Axis 1 Encoder Interface		+5V	1	5V power supply connection, requires twisted pair
			GND	2	
			--NC	3,4	Retain pins
			Data+	5	Communication signal end, requires twisted pair
			Data-	6	
			FG	--	Shielded wire connector housing
ECD2	Module Axis 2 Encoder Interface		+5V	1	Encoder 5V power supply, requires twisted pair
			GND	2	
			--NC	3,4	Retain pins
			Data+	5	Encoder signal line, requires twisted pair
			Data-	6	
			FG	--	Shielded wire connector housing

ECD3	Module Axis 3 Encoder Interface		+5V	1	Encoder 5V power supply, requires twisted pair
			GND	2	
			--NC	3,4	Retain pins
			Data+	5	Encoder signal line, requires twisted pair
			Data-	6	
			FG	--	Shielded wire connector housing
CN2(STO)[注5]	STO safety torque shutdown		STO1+	1	STO input 1
			STO1-	2	
			STO2+	3	STO input 2
			STO2-	4	
			OUT+	5	STO action output
			OUT-	6	

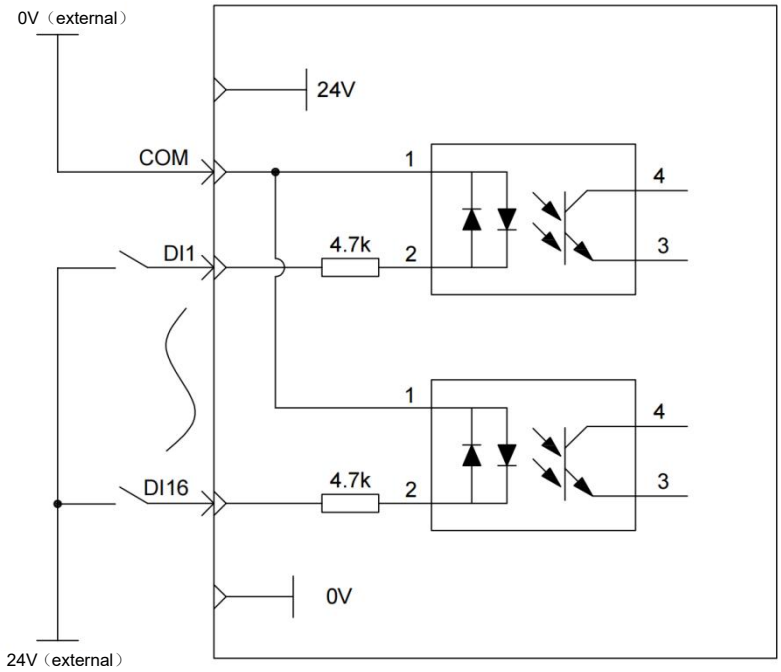
Note 5: Only the M900 series has STO function, other series do not.

5.2.5 Drive Module Control Circuit Terminal (CN1) DI/DO connection

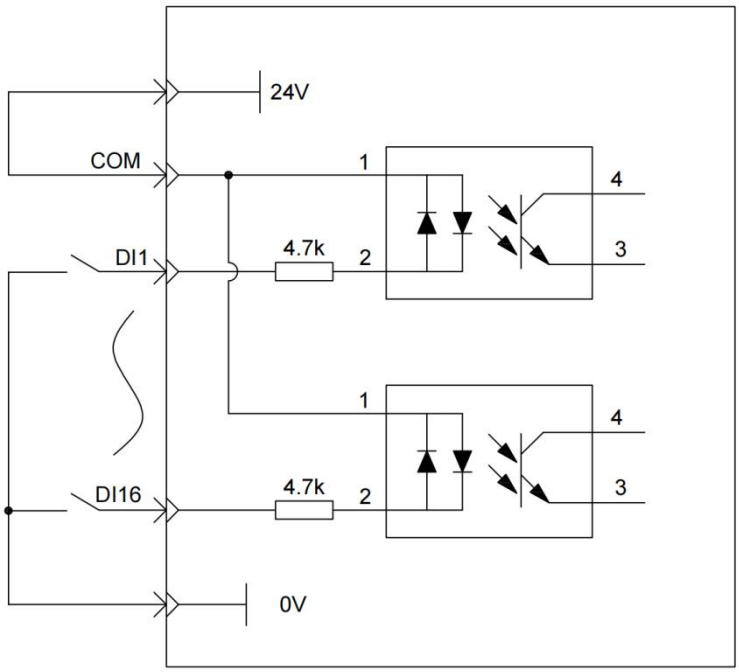
- When DI uses external 24V (NPN):



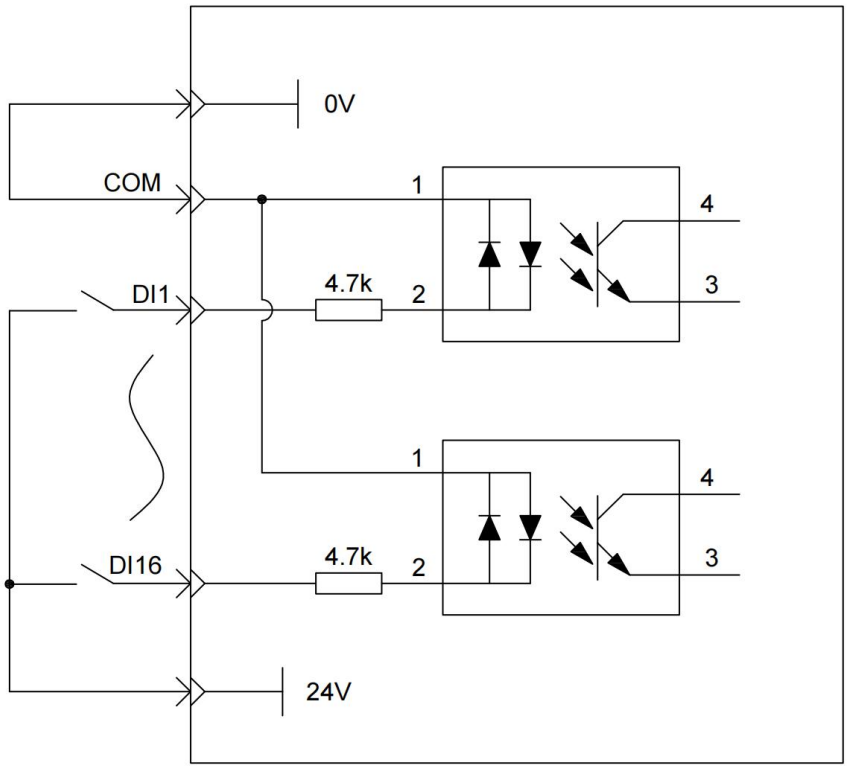
- When DI uses external 24V (PNP)



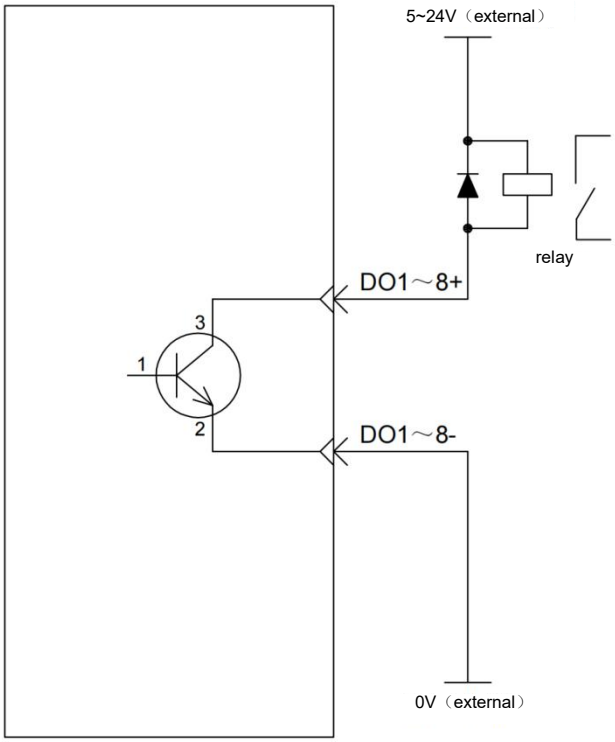
- When DI uses internal 24V (NPN):



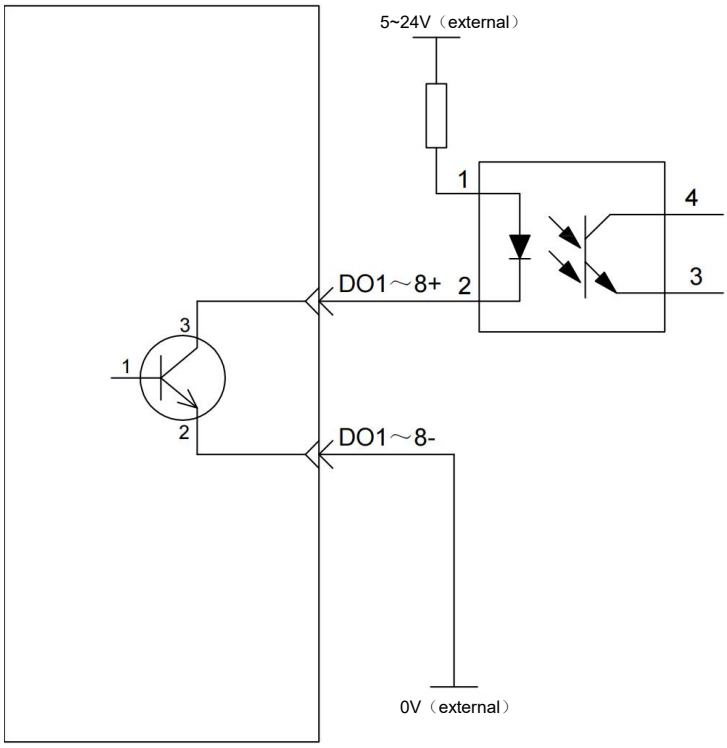
- When DI uses internal 24V (PNP):



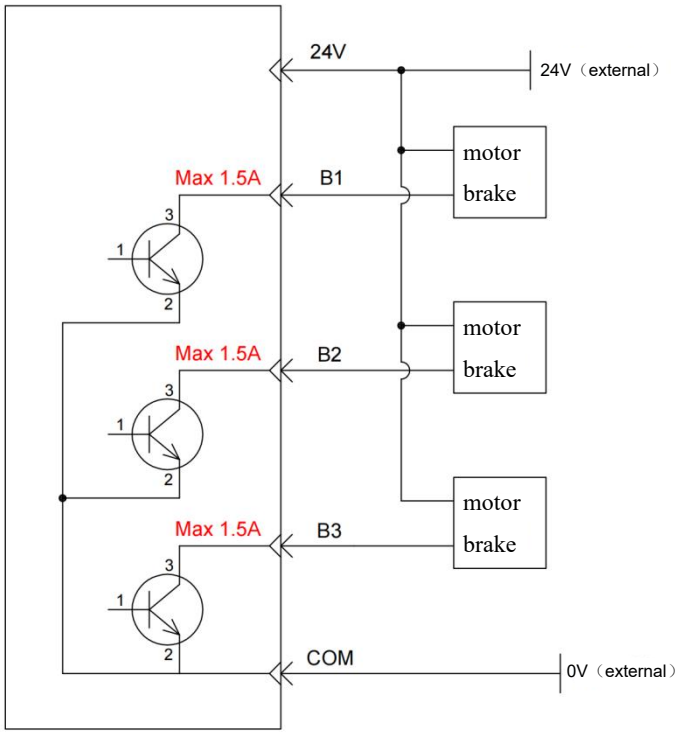
- When the DO output is a relay



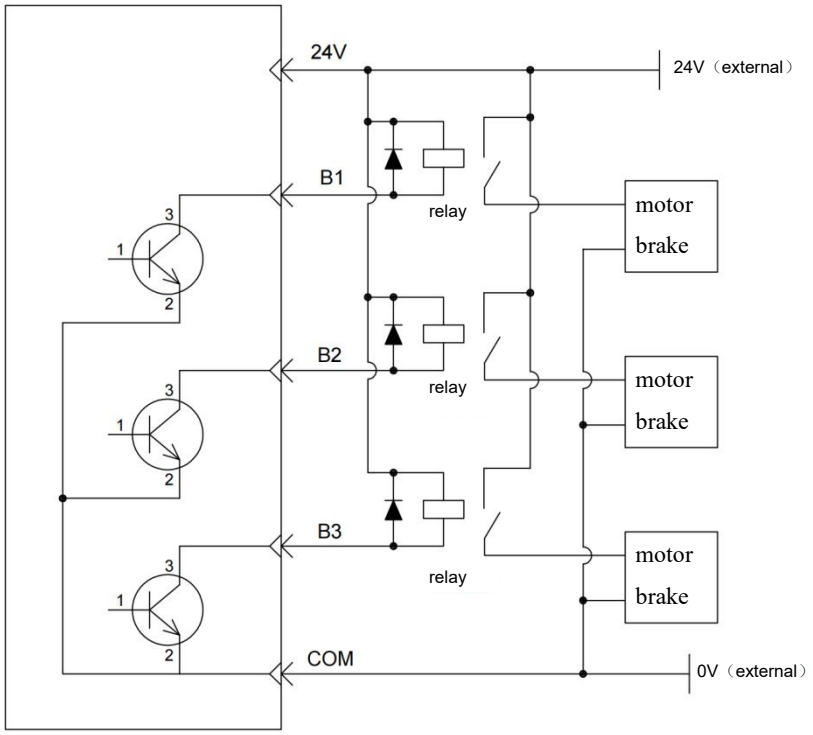
➢ When the DO output is an optocoupler



➢ When the output current of the brake control is ≤ 1.5A, directly use B1, B2, B3 to output and control the motor brake



- When the output current of the brake control is greater > 1.5A, the motor brake is controlled through a relay



6. Operation and Commissioning

6.1 Using the Commissioning Keypad

The servo drive can be debugged, parameter set or modified, and work status monitored through its built-in keypad, and adopts an external pull-out design (Max 20 meters) to achieve intuitive debugging in safe areas.

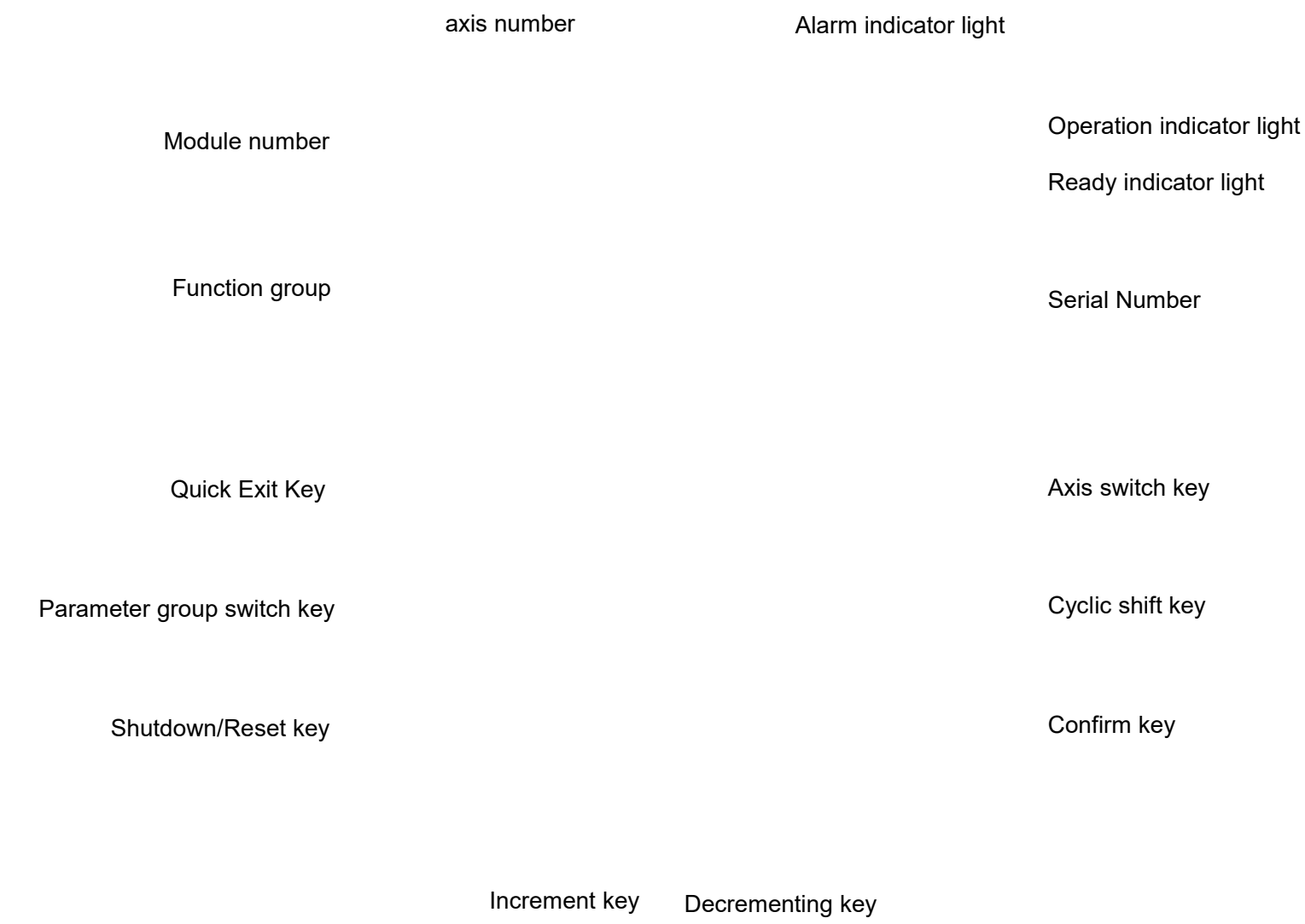


Figure 6-1 Introduction to Debugging Keyboard

6.2 Commissioning Keypad Key Definitions

key	name	Function Introduction
ESC	Quick Exit Key	Quickly exit the current interface to the normal monitoring interface
AXIS	Axis switch key	Used to select and switch axis numbers
MOD	Function switch key	Entry and exit of the first level menu
∧	Incremental key	data or function code Incremental
∨	Decreasing key	Data or function code decreasing
≪	shift key	When modifying parameters, use the shift key to select the modification bit of the parameter
SET	Set key	Step by step access to submenus, set parameters
STOP RES	Shutdown/Reset button	Under the control mode of the operation panel, press this key to stop the drive from running; When in a fault state, press this key to reset the fault

6.3 Basic Commissioning Steps for Drives

1. Wiring

Connect the power line, motor line, encoder line, IO line, braking resistor line and other lines to the drive. After connecting the lines, check whether the power voltage is normal, whether the motor line and encoder line correspond one-to-one, and whether the motor line phase sequence corresponds.

2. Power on

Connect the power supply and check the status of the ERR and RUN lights on the drive module. If only the RUN light is flashing, it indicates that the drive has entered the ready state. If both the RUN and ERR lights are flashing, it indicates that the drive is not ready and the encoder wiring needs to be checked.

3. Trial operation

After the drive is ready, it is recommended to conduct a trial run of each axis using the keypad first, or through the host computer software or SDO settings to ensure that the electrical circuits and parameter settings of each axis are correct:

Switch to the corresponding axis through the AXIS button, for example, AXIS displays 0.0, representing the parameter debugging interface of the power module, AXIS displays 1.1, representing the first axis of the first drive module；

Set P0-02 as the corresponding motor code；

2> Set P0-04 to 1 (allows modification of P0-06 and P0-07 parameters)；

3> Set P0-06 and P0-07 to 100 (maximum torque output is 100%)；

4> Set P0-10 to 1 (keypad control)；

5> Set P0-61 to 100 (speed command 100rpm)；

6> Set P0-17 to 1 (current axis servo enabled)；

Trial operation After enabling, check whether the motor is running at a speed of 100rpm, If there is motor

runaway, stalling, or abnormal noise,it is necessary to recheck the power line phase sequence or motor code, or whether the motor zero point is correct.7> Set P0-17 to 0 (current axis servo enable off)；
8> Set P0-06 and P0-07 to 300 (maximum torque output of 300%)；
9> Set P0-04 to 0 (prohibit modifying P0-06 and P0-07 parameters)；

4. EtherCAT communication operation

After the trial run is completed, it can be switched to EtherCAT bus communication control:
1> Set P0-10 to 3 (EtherCAT control mode)；
2>P0-50 is set to the same communication cycle as the master station (P0-50 unit is 125 us). For example, if the controller communication cycle is 1ms, P0-50 is set to 8. If the communication cycle is 2ms, P0-50 is set to 16（Just set P0-50 for axis 1, P0-50 for axis 2 and axis 3 does not need to be set）；
3> Check the electronic gear settings in the 402 dictionary, namely 6091 (module 1 axis), 6891 (module 2 axis), and 7091 (module 3 axis). According to the requirements of the host computer, it is recommended to set them to 1:1. At this time, the pulse feedback of each motor rotation is the actual number of lines in the encoder.

7. Function Codes

7.1 Function Code List

7.1.1 Parameter and Attribute Definitions

Function group	Function Description	quantity	width
P0	Basic parameter group	100	16bit
P1	Advanced debugging parameters	100	
P2	Motor parameter group	100	
P3	Functional parameter group	100	
d0	Monitoring parameter group	100	
ErrCode	Alarm code and description	100	

Function Codes identification description			
R	Read only parameters, users cannot modify them	●	Parameter modification must be powered on again to be effective
B	IO status display	K	Restore to factory and maintain original value
H	Hexadecimal parameter, modify bit by bit	☆	Related to the drive model
-	Have symbol	※	DI/DO implementation needs to be configured, refer to the DI/DO function configuration table
L	32-bit data	P	Position control
■	Cannot be modified during servo operation status	S	Speed control
▲	Do not save parameter values after power failure	T	Torque control

7.1.2 Power Module Servo Parameter Group

7.1.2.1 Basic parameter group

P0group	Basic parameter group								
Functio-n code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Setting Range**	**Unit**	**Factory value**	**Attrib-ute**	**Asso-ciated mode**
P0-00	22000	0X2100:01	Software version	Software version	0~65535		1000	R	
P0-01	22001	0X2100:02	reserve	reserve	-		-		

P0-02	22002	0X2100:03	reserve	reserve	-		-		
P0-03	22003	0X2100:04	Parameter management	Units&Tens:reserve Hundreds:restore factory parameters 0:No action 1:Restore factory Settings (automatically reset to zero after completion) Thousands:reserve	0x0000~0x1111		0x0000		
P0-04	22004	0X2100:05	DO function	Units&Tens: 00:No function 01:fault output 02:Instantaneous power outage output Hundreds:Output model 0:Positive logic 1:Negative logic	0x0000~0x0102		0x0000		
P0-05	22005	0X2100:06	Emergency stop signal polarity	Hundreds:Polarity setting 0:Positive logic 1:Negative logic	0x0000~0x0100		0x0000		
P0-06	22006	0X2100:07	DI function	Units&Tens:function 00:No function Hundreds:polarity 0:Positive logic 1:Negative logic	0x0000~0x0100		0x0000		
P0-07	22007	0X2100:08	reserve	reserve	-		0		
P0-08	22008	0X2100:09	Virtual bus voltage	Virtual bus voltage	0~400.0	0.1 V	300.0		
P0-09	22009	0X2100:10	Function parameter password	Function parameter password	0		0		
P0-10	22010	0X2100:11	reserve	reserve	0		0		
P0-11	22011	0X2100:12	Parameter backup mode	0:Automatic backup 1:Manual backup	0~1		1		
P0-12	22012	0X2100:13	Parameter backup flag	0:Not backed up 0xea55:Already backed up	0		0		
P0-13	22013	0X2100:14	Number of backup modules	Number of backup modules	0		0		
P0-14	22014	0X2100:15	Backup running time high position	Module waiting for backup time record	0		0		
P0-15	22015	0X2100:16	Backup running time low position						
P0-16~ P0-19	22016~ 22019	0X2100:17~ 0X2100:20	reserve	reserve	-		-		

P0-20	22020	0X2100:21	Manually backup password	0xea77:Start parameter backup 0xea78:Start parameter recovery	0		0		
P0-21	22021	0X2100:22	Module 1UID high bit	Module 1UID high bit	0		0		
P0-22	22022	0X2100:23	Module 1UID low bit	Module 1UID low bit	0		0		
P0-23	22023	0X2100:24	Module 2UID high bit	Module 2UID high bit	0		0		
P0-24	22024	0X2100:25	Module 2UID low bit	Module 2UID low bit	0		0		
P0-25	22025	0X2100:26	Module 3UID high bit	Module 3UID high bit	0		0		
P0-26	22026	0X2100:27	Module 3UID low bit	Module 3UID low bit	0		0		
P0-27	22027	0X2100:28	Module 4UID high bit	Module 4UID high bit	0		0		
P0-28	22028	0X2100:29	Module 4UID low bit	Module 4UID low bit	0		0		
P0-29	22029	0X2100:30	Module 5UID high bit	Module 5UID high bit	0		0		
P0-30	22030	0X2100:31	Module 5UID low bit	Module 5UID low bit	0		0		
P0-31~ P0-39	22031~ 22039	0X2100:32~ 0X2100:40	reserve	reserve	-		-		
P0-40	22040	0X2100:41	Module 1 Axis 1 Power	Module 1 Axis 1 Power	4		4		
P0-41	22041	0X2100:42	Module 1 Axis 2 Power	Module 1 Axis 2 Power	4		4		
P0-42	22042	0X2100:43	Module 1 Axis 3 Power	Module 1 Axis 3 Power	4		4		
P0-43	22043	0X2100:44	Module 2 Axis 1 Power	Module 2 Axis 1 Power	4		4		
P0-44	22044	0X2100:45	Module 2 Axis 2 Power	Module 2 Axis 2 Power	4		4		
P0-45	22045	0X2100:46	Module 2 Axis 3 Power	Module 2 Axis 3 Power	4		4		
P0-46	22046	0X2100:47	Module 3 Axis 1 Power	Module 1 Axis 1 Power	4		4		
P0-47	22047	0X2100:48	Module 3 Axis 2 Power	Module 1 Axis 2 Power	4		4		
P0-48	22048	0X2100:49	Module 3 Axis 3 Power	Module 1 Axis 3 Power	4		4		
P0-49	22049	0X2100:50	Module 4 Axis 1 Power	Module 2 Axis 1 Power	4		4		
P0-50	22050	0X2100:51	Module 4 Axis 2	Module 2 Axis 2 Power	4		4		

			Power						
P0-51	22051	0X2100:52	Module 4 Axis 3 Power	Module 2 Axis 3 Power	4		4		
P0-52	22052	0X2100:53	Module 5 Axis 1 Power	Module 2 Axis 1 Power	4		4		
P0-53	22053	0X2100:54	Module 5 Axis 2 Power	Module 2 Axis 2 Power	4		4		
P0-54	22054	0X2100:55	Module 5 Axis 3 Power	Module 2 Axis 3 Power	4		4		
P0-55~ P0-79	22055~ 22079	0X2100:56~ 0X2100:80	reserve	reserve	-		-		
P0-80	22080	0X2100:81	One click aging parameters		0~6		0		
P0-81	22081	0X2100:82	Internal function switch	Units:Busbar voltage correlation adjustment enabled 0:Close 1:Enable Thousands:reserve 0:Normal mode	0x0000~0x111		0x0000	H	P.S.T
P0-82	22082	0X2100:83	reserve	reserve	-		-		
P0-83	22083	0X2100:84	reserve	reserve	-		-		
P0-84	22084	0X2100:85	VDC calibration	27800~37683	27800~37683		27800	K	P.S.T
P0-85	22085	0X2100:86	High position of serial number (first test year)	2015~2029	2015~2029		2017	K	P.S.T
P0-86	22086	0X2100:87	Median of serial number (first test month day)	0101~1231	0101~1231		907	K	P.S.T
P0-87	22087	0X2100:88	Low position of serial number (first test serial number)	0x0000~0xFFFF	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-88	22088	0X2100:89	Single board tooling testing QC label	0xA7E3:Pass other:NG	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-89	22089	0X2100:90	Test the QC label before aging	0x8F68:Pass other:NG	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-90	22090	0X2100:91	12-hour aging test label	0x5A5A:Pass other:NG	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-91	22091	0X2100:92	Test label for the entire machine after aging	0xB80F:Pass other:NG	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-92	22092	0X2100:93	Function password	E5DA:Clear encoder multi turn values	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-93	22093	0X2100:94	reserve						
P0-94	22094	0X2100:95	reserve	reserve					
P0-95	22095	0X2100:96	reserve	reserve	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-96	22096	0X2100:97	reserve	reserve	0x0000~0xFFFF		0x0000	H/R/K	P.S.T

P0-97	22097	0X2100:98	reserve	reserve	0x0000~0xFFFF		0x0000	H/R/K	P.S.T
P0-98	22098	0X2100:99	reserve	reserve	0x0000~0xFFFF		0x0000	H/R/K	P.S.T
P0-99	22099	0X2100:100	reserve	reserve	0x0000~0xFFFF		0x0000	H/K	

7.1.2.2 Monitoring parameter group

d0group	Monitoring parameter group				
Function Codes	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Unit**
d0-00	30000	0X3000:01	bus voltage		
d0-01	30001	0X3000:02	Module Temperature		
d0-02	30002	0X3000:03	DIDO status monitoring		
d0-03	30003	0X3000:04	Historical lowest bus voltage		
d0-04	30004	0X3000:05	Historical highest bus voltage		
d0-05	30005	0X3000:06	Internal bus communication error count		
d0-06~d0-08	30006~30008	0X3000:07~0X3000:09	reserve		
d0-09	30009	0X3000:10	Number of module connections		
d0-10~d0-16	30010~30016	0X3000:11~0X3000:17	reserve		
d0-17	30017	0X3000:98	Software version-year		
d0-18	30018	0X3000:99	Software version-month day		
d0-19	30019	0X3000:100	Software version-SN		

7.1.2.3 Alarm code and description

ErrCode	**Alarm code and description**			
Function Codes	**ETHERCAT code**	**Function Codes name**	**Parameter Description**	**Can it be reset**
Er.001	0xFF01	Alarm for excessively high temperature	Drive temperature exceeding 85 ℃ alarm	
Er.002	0xFF02	Undervoltage alarm	DC bus voltage below 185V alarm	
Er.003	0xFF03	Over voltage alarm	Braking voltage threshold is 385V, 395V overvoltage alarm	
Er.004	0xFF04	reserve		
Er.005	0xFF05	reserve		
Er.006	0xFF06	Alarm for excessively low temperature	Low temperature alarm when the temperature is below -30 ℃	
Er.007	0xFF07	Hardware encryption error	Drive hardware that has not undergone hardware decryption or piracy	
Er.008	0xFF08	Emergency stop alarm	The DI terminal of the drive has an emergency stop signal input	
Er.009	0xFF09	Power disconnected	External power supply disconnected	

7.1.3 Drive Module Axis 1 Servo Parameter Group

7.1.3.1 Basic parameter group

P0 group	Basic parameter group								
Function code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Setting Range**	**Unit**	**Factory value**	**Attribute**	**Associated mode**
P0-00	20000	0X2000:01	Software version	Software version	0~65535		1000	R	
P0-01	20001	0X2000:02	Drive model	4:S5R0（5.0A）220V 5:S8R0（8.0A）220V 6:S015（15A）220V 7~8:reserve	4~8		4	■	
P0-02	20002	0X2000:03	Motor code	Motor ID:1000~3500	1000~3500		1400	■	
P0-03	20003	0X2000:04	Parameter management	Units、Tens:reserve Hundreds:restore factory parameters 0:No action 1:Restore factory Settings (automatically reset to zero after completion) Thousands:reserve	0x0000~0x1111		0x0000	H/■	P.S.T
P0-04	20004	0X2000:05	Manufacturer's functional parameters	0:Prohibit modifying P0-06/07 parameters 1:Allow modification of P0-06/07 parameters	0~1		0		
P0-05	20005	0X2000:06	Maximum speed threshold	0~6000	0~6000	rpm	4500		
P0-06	20006	0X2000:07	Forward maximum torque limit	0~300	0~300	%	300		
P0-07	20007	0X2000:08	Reverse maximum torque limit	0~300	0~300	%	300		
P0-08	20008	0X2000:09	Motor direction logic	0:Take CCW direction as the forward rotation direction 1:Take CW direction as the forward rotation direction	0~1		0	■	
P0-09	20009	0X2000:10	Encoder type setting	Units:Encoder type 0:Incremental type, 1:Multi-turn absolute value type 2:Single-turn absolute value type 3:Infinite rotation mode Tens: 0:Activate the flying car alarm 1:Shield the flying car alarm	0x0000~0x2113		0x1100		

				Hundreds: 0:Ethercat speed unit selectionrpm 1:Ethercat speed unit selectionpp/s Thousands:Motor code recognition 0:Turn off the automatic recognition of motor codes 1:Enable the automatic recognition of motor codes 2:Write the motor code into the motor					
P0-10	20010	0X2000:11	control mode	0:TRQ 1:SPD 2:POS 3:EtherCAT	0~13		0		PS
P0-11	20011	0X2000:12	Brake ON delay time	The delay time from the servo receiving the Servo On instruction to the brake On	100~500	ms	100	■	P.S.T
P0-12	20012	0X2000:13	Static state, brake OFF - servo OFF delay	The delay time from when the servo receives the Servo Off instruction to when the motor is not powered on	1~1000	ms	100	■	P.S.T
P0-13	20013	0X2000:14	reserve						
P0-14	20014	0X2000:15	reserve						
P0-15	20015	0X2000:16	Overload protection coefficient of motor	10~100	10~100	%	50		
P0-16	20016	0X2000:17	USB monitoring settings	Units:USB low-speed monitoring sampling interval, unit ms(0~5) 0~5 Tens:USB monitoring mode setting 0:Close monitoring 1:Low-speed monitoring 2:High speed monitoring, sampling frequency 8k 3:High speed monitoring, sampling frequency 16k Hundreds:reserve Thousands:reserve	0x0000~ 0x0035		0x0000	H/■	P.S.T
P0-17	20017	0X2000:18	Keyboard enables control word	0:Servo OF,1:Servo ON	0~1		0	■	
P0-18	20018	0X2000:19	External emergency stop control	Units:External emergency stop alarm detection enabled 0:Do not detect external emergency stop signals 1:Detecting external emergency stop signals	0x0000~ 0x0011		0	■	

				Tens:Associated alarm enable 0:Do not enable associated alarms 1:Enable associated alarm					
P0-19	20019	0X2000:20	reserve						
P0-20	20020	0X2000:21	Load inertia ratio	The ratio of load inertia to motor inertia	0~3000	%	100		S
P0-21	20021	0X2000:22	Velocity loop gain	The larger the response, the faster the response. If it is too large, it will cause vibration. The position mode and position loop gain will be adjusted in coordination	20~20000	0.1 Hz	800		S
P0-22	20022	0X2000:23	velocity loop integral time constant	The larger the integral, the stronger the integration effect, and the stronger the speed tracking ability, which needs to be coordinated with the velocity loop gain and position loop gain	0~20000	0.1 Hz	10		S
P0-23	20023	0X2000:24	Position loop gain	The larger the response, the faster the response. If it is too large, it will cause vibration. The position mode and position loop gain will be adjusted in coordination	20~20000	0.1 Hz	200		P
P0-24	20024	0X2000:25	The second velocity loop gain	The larger the response, the faster the response. If it is too large, it will cause vibration. The position mode and position loop gain will be adjusted in coordination	20~20000	0.1 Hz	800		S
P0-25	20025	0X2000:26	The integral time constant of the second velocity loop	The smaller the value, the stronger the integration effect, and the stronger the speed tracking ability, which needs to be coordinated with the velocity loop gain and position loop gain	20~1000.0	0.1 Hz	125		S
P0-26	20026	0X2000:27	The second Position loop gain	The larger the response, the faster the response. If it is too large, it will cause vibration. The position mode and position loop gain will be adjusted in coordination	20~2000.0	0.1 Hz	200		P
P0-27	20027	0X2000:28	Speed feedforward selection	Units:Speed feedforward selection 0:Internal speed feedforward(P0-28) 1:External given Tens:Torque feedforward selection 0:Internal torque feedforward 1:External given Hundreds:Multi segment gain selection 0:Default first set of gain	0x0000~ 0x1111		0x0000	■	P

				parameters 1:Switching between two sets of gains based on (P0-72,73) Thousands:Torque limit selection 0:Internal limit（P0-06,07） 1:External Limiting - Object Dictionary 0x6072- Axis 1					
P0-28	20028	0X2000:29	Speed feedforward gain	Increasing can reduce the steady-state position deviation; excessive increase will cause overshoot	0~100	%	0		P
P0-29	20029	0X2000:30	Speed feedforward smoothing filter constant	Smooth the speed feedforward quantity and coordinate with the speed feedforward gain for regulation	0~64.0	ms	0		P
P0-30	20030	0X2000:31	reserve	reserve	50~1000		100		P
P0-31	20031	0X2000:32	DI1function	Units&Tens: 00~05:reserve 08:Emergency stop 09:Axis 1 origin switch 0A:Axis 2 origin switch 0B:Axis 3 origin switch 0C:Axis 1 forward limit 0D:Axis 2 forward limit 0E:Axis 3 forward limit 0F:Axis 1 negative limit 10:Axis 2 negative limit 11:Axis 3 negative limit 12:Axis 1 probe 1 13:Axis 2 probe 1 14:Axis 3 probe 1 15:Axis 1 probe 2 16:Axis 2 probe 2 17:Axis 3 probe 2 Hundreds: 0:Positive logic 1:Negative logic	0x0000~ 0x0117		000C		
P0-32	20032	0X2000:33	DI2 function	Same as P0-31	0x0000~ 0x0117		000F		
P0-33	20033	0X2000:34	DI3 function	Same as P0-31	0x0000~ 0x0117		0009		
P0-34	20034	0X2000:35	DI4 function	Same as P0-31	0x0000~ 0x0117		0012		
P0-35	20035	0X2000:36	DI5 function	Same as P0-31	0x0000~ 0x0117		0015		
P0-36	20036	0X2000:37	reserve	reserve					
P0-37	20037	0X2000:38	DI filtering	0~32ms	0~32		0		

			time(DI1~DI6)						
P0-38	20038	0X2000:39	Electronic gear selection	0:Set value using object dictionary 0x6091 1:Use P0-39 (high) and P0-40 (low) values	0~1		0		
P0-39	20039	0X2000:40	Number of position command pulses per motor revolution (high-order bits)	0~20000	0~20000		838	■	P
P0-40	20040	0X2000:41	Number of position command pulses per motor revolution (low-order bits)	0~9999 Pulse per revolution=(P0-39)*10000+(P0-40)	0~9999		8608	■	P
P0-41	20041	0X2000:42	Moving average filter constant	--	0~200.0	ms	0		P
P0-42	20042	0X2000:43	First-order low-pass filter constant	--	0~6000.0	ms	0		P
P0-43	20043	0X2000:44	reserve	--	0~65535		0	L	P
P0-44	20044	0X2000:45	reserve	--	0~16384		2		
P0-45	20045	0X2000:46	reserve	--	0~65535		10000	L	P
P0-46	20046	0X2000:47	reserve	--	0~16384		0		
P0-47	20047	0X2000:48	reserve	--	4~16384		2500	■	P
P0-48	20048	0X2000:49	reserve	--	0x0000~ 0x0001		0x0000	H/■	P
P0-49	20049	0X2000:50	Position deviation limit	0.1~50.0circles	0.1~50.0		10.0	■	
P0-50	20050	0X2000:51	EtherCAT synchronization cycle	1~256 (x0.125ms)=[0.125ms~32ms]	1~256	0.125 /ms	8		
P0-51	20051	0X2000:52	Compensation value for CCW direction of quadrant protrusion	0~1000‰	0~1000		0		
P0-52	20052	0X2000:53	Compensation value for CW direction of quadrant protrusion	0~1000‰	0~1000		0		
P0-53	20053	0X2000:54	Quadrant bulge compensation delay	0~1000ms	0~1000		0		

P0-54	20054	0X2000:55	Quadrant bulge compensation filtering	0~100ms	0~100		0		
P0-55	20055	0X2000:56	Gravity compensation value	0~1000‰	0~1000		0		
P0-56	20056	0X2000:57	Gravity compensation polarity	0:CCW direction compensation 1:CW direction compensation	0~1		0		
P0-57	20057	0X2000:58	Frequency of notch filter	10-5000 Hz	10~5000		100		
P0-58	20058	0X2000:59	Depth of notch filter	0~20	0~20		10		
P0-59	20059	0X2000:60	Notch filter gain	0~500%	0~500		0		
P0-60	20060	0X2000:61	Zero offset of magnetic pole	0~2048,<<12	0~2048		253		
P0-61	20061	0X2000:62	Speed command (for debugging)	Speed mode instruction Pn parameter instruction given	0~4500	rpm	100		
P0-62~ P0-64	20062~ 20064	0X2000:63~ 0X2000:65	reserve						
P0-65	20065	0X2000:66	Ud-Kp	130	0~800		50		
P0-66	20066	0X2000:67	Ud-Ki	25	0~500		25		
P0-67	20067	0X2000:68	Uq-Kp	130	0~300		50		
P0-68	20068	0X2000:69	Uq-Ki	25	0~300		25		
P0-69	20069	0X2000:70	reserve						
P0-70	20070	0X2000:71	Speed command polarity	0~1	0~1		0		
P0-71	20071	0X2000:72	Servo adaptive rigidity	20~20000（Prevent nodding phenomenon during the enabling process under gravity or load conditions)	20~20000		1200	▲	
P0-72	20072	0X2000:73	The first set of gain speed inflection points	/	0~6000	rpm	6000		
P0-73	20073	0X2000:74	The Second set of gain speed inflection points	/	0~6000	rpm	6000		
P0-74~ P0-79	20074~ 20079	0X2000:75~ 0X2000:80	reserve						
P0-80	20080	0X2000:81	One click aging parameters		0~6		0		

P0-81	20081	0X2000:82	Internal function switch	Units:Busbar voltage correlation adjustment enabled 0:Close 1:Enable Tens:Dead zone compensation enabled 0:Close 1:Enable Hundreds:Peak current suppression 0:Close 1:Enable Thousands:reserve 0:Normal mode	0x0000~ 0x111		0x0000	H	P.S.T
P0-82	20082	0X2000:83	Manufacturer calibration mode	Units:Manufacturer's current calibration mode 0:Close 1:Enable, For internal motor calibration by the manufacturer only otherPosition:reserve	0x0000~ 0x0001		0x0000	H	PST
P0-83	20083	0X2000:84	reserve						
P0-84	20084	0X2000:85	VDC calibration	27800~37683	27800~ 37683		27800	K	P.S.T
P0-85	20085	0X2000:86	High position of serial number (first test year)	2015~2029	2015~ 2029		2017	K	P.S.T
P0-86	20086	0X2000:87	Median of serial number (first test month day)	0101~1231	0101~ 1231		907	K	P.S.T
P0-87	20087	0X2000:88	Low position of serial number (first test serial number)	0x0000~0xFFFF	0x0000~ 0xFFFF		0x0000	H/K	P.S.T
P0-88	20088	0X2000:89	Single board tooling testing QC label	0xA7E3:Pass other:NG	0x0000~ 0xFFFF		0x0000	H/K	P.S.T
P0-89	20089	0X2000:90	Test the QC label before aging	0x8F68:Pass other:NG	0x0000~ 0xFFFF		0x0000	H/K	P.S.T
P0-90	20090	0X2000:91	12-hour aging test label	0x5A5A:Pass other:NG	0x0000~ 0xFFFF		0x0000	H/K	P.S.T
P0-91	20091	0X2000:92	Test label for the entire machine after aging	0xB80F:Pass other:NG	0x0000~ 0xFFFF		0x0000	H/K	P.S.T
P0-92	20092	0X2000:93	Function password	E5DA:Clear encoder multi-turn value	0x0000~ 0xFFFF		0x0000	H/K	P.S.T

P0-93	20093	0X2000:94	reserve						
P0-94	20094	0X2000:95	reserve	reserve					
P0-95	20095	0X2000:96	reserve	reserve	0x0000~ 0xFFFF		0x0000	H/K	P.S.T
P0-96	20096	0X2000:97	reserve	reserve	0x0000~ 0xFFFF		0x0000	H/R/K	P.S.T
P0-97	20097	0X2000:98	reserve	reserve	0x0000~ 0xFFFF		0x0000	H/R/K	P.S.T
P0-98	20098	0X2000:99	reserve	reserve	0x0000~ 0xFFFF		0x0000	H/R/K	P.S.T
P0-99	20099	0X2000:100	reserve	reserve	0x0000~ 0xFFFF		0x0000	H/K	

7.1.3.2 Advanced Debugging Parameter Group

P1 group	Advanced Debugging Parameter Group								
Function code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Setting Range**	**Unit**	**Factory value**	**Attribute**	**Associated mode**
P1-00	20100	0X2001:01	Self-adjusting mode	0:Manual adjustment 1:Rigidity grade adjustment 2:Position loop bandwidth+inertia self adjustment (slowly changing) 3:Position loop bandwidth+inertia self adjustment (rapid change)	0~3		0		
P1-01	20101	0X2001:02	Rigidity grade	Rigidity grade setting	1~32		12		
P1-02	20102	0X2001:03	reserve	reserve	0~65535		0		
P1-03	20103	0X2001:04	Inertia identification mode	0:Internal command round-trip motion mode 1:Controller instruction mode 2:Continuous automatic identification	0~2		0		
P1-04	20104	0X2001:05	Inertia identification completion mark	0:Inertia identification incomplete 1:Inertia identification completed	0~1		0		
P1-05	20105	0X2001:06	Inertia identification maximum speed	Inertia identification allows for maximum operating speed	300~3000	rpm	1000		
P1-06	20106	0X2001:07	Inertia identification acceleration time	Inertia identification speed accelerates from 0 to 5000 revolutions per minute	10~30000	ms	100		
P1-07	20107	0X2001:08	Maximum number of motion cycles for inertia	The allowable number of operating cycles for inertia	1~50	r	5		

			identification	identification					
P1-08	20108	0X2001:09	Waiting time for completion of single inertia identification	Waiting time for completion of single inertia identification motion	0~30000	ms	100		
P1-09~ P1-14	20109~ 20114	0X2001:10~ 0X2001:15	reserve	reserve	0~65535		0		
P1-15	20115	0X2001:16	Vibration detection threshold	Vibration detection threshold	0~100		100		
P1-16	20116	0X2001:17	Vibration detection time	Vibration detection time	0~100		50		
P1-17	20117	0X2001:18	Frequency of the first notch filter	Frequency of notch filter	10~5000		5000		
P1-18	20118	0X2001:19	Width of the first notch filter	Width of notch filter	0~100		2		
P1-19	20119	0X2001:20	Depth of the first notch filter	Depth of notch filter	0~100		0		
P1-20	20120	0X2001:21	Frequency of the second notch filter	Frequency of notch filter	0~65535		5000		
P1-21	20121	0X2001:22	Width of the second notch filter	Width of notch filter	0~65535		2		
P1-22	20122	0X2001:23	Depth of the second notch filter	Depth of notch filter	0~65535		0		
P1-23	20123	0X2001:24	Frequency of the third notch filter	Frequency of notch filter	0~65535		5000		
P1-24	20124	0X2001:25	Width of the third notch filter	Width of notch filter	0~65535		2		
P1-25	20125	0X2001:26	Depth of the third notch filter	Depth of notch filter	0~65535		0		P
P1-26	20126	0X2001:27	Frequency of the fourth notch filter	Frequency of notch filter	0~65535		5000		P
P1-27	20127	0X2001:28	Width of the fourth notch filter	Width of notch filter	0~65535		2		P
P1-28	20128	0X2001:29	Depth of the fourth notch filter	Depth of notch filter	0~65535		0		
P1-29	20129	0X2001:30	Frequency of the fifth notch filter	Frequency of notch filter	0~65535		5000		
P1-30	20130	0X2001:31	Width of the fifth notch filter	Width of notch filter	0~65535		2		S
P1-31	20131	0X2001:32	Depth of the fifth notch filter	Depth of notch filter	0~65535		0		S
P1-32	20132	0X2001:33	End vibration suppression frequency	End positioning vibration suppression frequency	10~2000		2000		S
P1-33	20133	0X2001:34	End vibration suppression frequency compensation	End vibration suppression frequency compensation	0~200		100		S
P1-34	20134	0X2001:35	Maximum allowable weak magnetic current	Maximum allowable weak magnetic current	0~100		50		S

P1-35	20135	0X2001:36	Weak magnetic enablement	0:shut down the weak magnetic function 1:Enable weak magnetic function	0~1		0		S
P1-36	20136	0X2001:37	Weak magnetic gain	Weak magnetic gain	0~300		100%		S
P1-37	20137	0X2001:38	Weak magnetic point velocity	Enable weak magnetic control speed	0~6000		4000		P
P1-38	20138	0X2001:39	PDFF control gain coefficient	PDFF control gain coefficient	0~100		100		
P1-39	20139	0X2001:40	reserve						
P1-40	20140	0X2001:41	reserve						T
P1-41	20141	0X2001:42	reserve						T
P1-42	20142	0X2001:43	Disturbance compensation time coefficient	Disturbance compensation time coefficient	0~40000	0.1 Hz	15.0		T
P1-43	20143	0X2001:44	Disturbance cut-off frequency	Disturbance cut-off frequency	0~40000	0.1 Hz	400.0		T
P1-44	20144	0X2001:45	Disturbance compensation gain	Disturbance compensation gain	0~100	%	0.0		T
P1-45	20145	0X2001:46	Disturbance observer inertia correction coefficient	Disturbance observation inertia correction coefficient	0~3000	%	100		
P1-46	20146	0X2001:47	Model tracking control mode	0:Do not use model tracking control 1:Activate model tracking control + rigid body model 2:Enable model tracking control+dual inertia model	0~2	%	0		
P1-47	20147	0X2001:48	Model tracking control gain	Model tracking control gain	0~30000	0.1 Hz	400		
P1-48	20148	0X2001:49	Model tracking control compensation gain	Model tracking control compensation gain	0~200	%	100		
P1-49	20149	0X2001:50	Double inertia model resonant frequency	Double inertia model resonant frequency	10~2500	0.1 Hz	700		
P1-50	20150	0X2001:51	Double inertia model resonance frequency	Double inertia model anti-resonant frequency	10~2500	0.1 Hz	500		
P1-51	20151	0X2001:52	Double inertia model velocity feedforward value	Double inertia model velocity feedforward value	0~100	%	0		
P1-52	20152	0X2001:53	Doublel inertia model torque feedforward value	Doublel inertia model torque feedforward value	0~100	%	0		
P1-53	20153	0X2001:54	reserve						
P1-54	20154	0X2001:55	reserve						
P1-55	20155	0X2001:56	Torque ripple suppression frequency	Torque ripple suppression frequency	1~50000	0.1 Hz	400		
P1-56	20156	0X2001:57	Torque ripple suppression	Torque ripple suppression compensation	0~1000	0.10%	0		

			compensation						
P1-57	20157	0X2001:58	Torque ripple suppression phase	Torque ripple suppression phase	0~2048		0		
P1-58	20158	0X2001:59	Torque command filtering cut-off frequency	Torque Instruction Filter Cut off Frequency	1~16000	Hz	4000		
P1-59~ P1-99	20159~ 20199	0X2001:60~ 0X2001:100	reserve						

7.1.3.3 Motor parameter group

P2 group	Motor parameter group								
Function code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Setting Range**	**Unit**	**Factory value**	**Attribute**	**Associated mode**
P2-00	20200	0X2002:01	Rated power of motor	Rated power of motor	1~65535	0.001 kw	75	R	
P2-01	20201	0X2002:02	Rated current of motor	Rated current of motor	1~65535	0.01 A	500	R	S
P2-02	20202	0X2002:03	Maximum current of motor	Maximum current of motor	1~65535	0.01 A	500	R	S
P2-03	20203	0X2002:04	Rated speed of motor	Rated speed of motor	100~6000	rpm	3000	R	P
P2-04	20204	0X2002:05	Maximum speed of motor	Maximum speed of motor	100~6000	rpm	6000	R	S
P2-05	20205	0X2002:06	Rated torque of motor	Rated torque of motor	10~65535	0.01 Nm	239	R	S
P2-06	20206	0X2002:07	Maximum torque of motor	Maximum torque of motor	10~65535	0.01 Nm	716	R	S
P2-07	20207	0X2002:08	Maximum speed torque value of motor	Maximum speed torque value of motor	10~65535	0.01 Nm	716	R	P
P2-08	20208	0X2002:09	Number of motor poles	Number of motor poles	2~100		5	R	S
P2-09	20209	0X2002:10	Motor back electromotive force coefficient	Motor back electromotive force coefficient	1~65535	0.01 mV/rpm	3330	R	
P2-10	20210	0X2002:11	Motor torque constant	Motor torque constant	1~65535	0.01 Nm/Arms	51	R	
P2-11	20211	0X2002:12	Motor rotor inertia	Motor rotor inertia	1~65535	0.01 kg.cm2	130	R	
P2-12	20212	0X2002:13	Motor D-axis inductance	Motor D-axis inductance	1~65535	0.01 mH	387	R	
P2-13	20213	0X2002:14	Motor Q-axis inductance	Motor Q-axis inductance	1~65535	0.01 mH	327	R	
P2-14	20214	0X2002:15	Motor stator resistance	Motor stator resistance	1~65535	0.001Ω	500	R	
P2-15	20215	0X2002:16	Electrical time constant of motor	Electrical time constant of motor	1~65535	0.01 ms	654	R	
P2-16	20216	0X2002:17	Mechanical time constant of motor	Mechanical time constant of motor	1~65535	0.01 ms	24	R	
P2-17	20217	0X2002:18	Motor zero offset	Motor zero offset	1~65535		205	R	
P2-18 ~P2-49	20218~ 20249	0X2002:19~ 0X2002:50	reserve	reserve	0~65535		0		
P2-50	20250	0X2002:51	Internal position mode acceleration and	Internal position mode speed accelerates from 0	10~60000	ms	500		

			deceleration time	to maximum speed time					
P2-51	20251	0X2002:52	Internal position mode position 1 high	Internal position mode position instruction 1 position	0~65535	p	0		
P2-52	20252	0X2002:53	Internal position mode position 1 low						
P2-53	20253	0X2002:54	Internal position mode position 2 high	Internal position mode position instruction 2 position	0~65536	p	0		
P2-54	20254	0X2002:55	Internal position mode position 2 low						
P2-55	20255	0X2002:56	reserve	reserve	0~65535		0		
P2-56	20256	0X2002:57	reserve	reserve	0~65535		0		
P2-57	20257	0X2002:58	reserve	reserve	0~65535		0		
P2-58	20258	0X2002:59	reserve	reserve	0~65535		0		
P2-59	20259	0X2002:60	reserve	reserve	0~65535		0		
P2-60	20260	0X2002:61	Black box channel 1 configuration	Configure the black box data recording channel	0~96		2		
P2-61	20261	0X2002:62	Black box channel 2 configuration	Configure the black box data recording channel	0~96		3		
P2-62	20262	0X2002:63	Black box channel 3 configuration	Configure the black box data recording channel	0~96		6		
P2-63	20263	0X2002:64	Black box channel 4 configuration	Configure the black box data recording channel	0~96		9		
P2-64 ~P2-99	20264~ 20299	0X2002:65~ 0X2002:100	reserve	reserve	0~65535		0		

7.1.3.4 Functional parameter group

P3 group	Functional parameter group								
Function code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Setting Range**	**Unit**	**Factory value**	**Attribute**	**Associated mode**
P3-00~ P3-16	20300~ 20316	0X2003:01~ 0X2003:17	reserve	reserve	0~65535		0		
P3-17	20317	0X2003:18	Fault detection switch	Units:Encoder speed measurement anomaly detection 0:Enable encoder speed measurement anomaly detection 1:Disable encoder speed measurement anomaly detection Tens:0:Enable software instantaneous overcurrent detection1:Turn off software instantaneous overcurrent detection	0x0000~ 0x0011		0x0001		

P3-18	20318	0X2003:19	DO1 function Settings	Units&Tens:Function Settings 00:No function 01:Axis 1 reserved state 02:Axis 2 reserved state 03:Axis 3 reserved state 04:Axis 1 enable Status 05:Axis 2 enable Status 06:Axis 3 enable Status 07:Axis 1 alarm status 08:Axis 2 alarm status 09:Axis 3 alarm status 0A: ETHERCAT virtual output DO1 0B: ETHERCAT virtual output DO2 0C: ETHERCAT virtual output DO3 0D: ETHERCAT virtual output DO4 0E: ETHERCAT virtual output DO5 0F: ETHERCAT virtual output DO6 10: ETHERCAT virtual output DO7 11: ETHERCAT virtual output DO8 Hundreds&Thousands:00:Positive logic 01:Negative logic	0x0000~ 0x0111		0x0000		
P3-19	20319	0X2003:20	DO2 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-20	20320	0X2003:21	DO3 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-21	20321	0X2003:22	DO4 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-22	20322	0X2003:23	DO5 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-23	20323	0X2003:24	DO6 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-24	20324	0X2003:25	DO7 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-25	20325	0X2003:26	DO8 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-26~ P3-99	20326~ 20399	0X2003:27~ 0X2003:100	reserve	reserve	0~65535		0		

7.1.3.5 Monitoring parameter group

d0 group	Monitoring parameter group				
Function code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Unit**
d0-00	30000	0X3000:01	Motor speed		rpm
d0-01	30001	0X3000:02	reserve		

d0-02	30002	0X3000:03	DIDO status monitoring	Low 8 indicates DI1~DI8, while high 8 indicates DO1~DO8	
d0-03	30003	0X3000:04	The encoder position feeds back the low bit		
d0-04	30004	0X3000:05	The encoder position feeds back the high bit		
d0-05	30005	0X3000:06	Positional deviation		
d0-06	30006	0X3000:07	q-axis voltage		
d0-07	30007	0X3000:08	Bus synchronization correction cycle	Bus synchronization correction cycle	
d0-08	30008	0X3000:09	d-axis voltage		
d0-09	30009	0X3000:10	Average load rate		
d0-10	30010	0X3000:11	Multi-circle position		
d0-11	30011	0X3000:12	Encoder obtains motor code	Encoder obtains motor code	
d0-12	30012	0X3000:13	Position command high position		
d0-13	30013	0X3000:14	Position command low position		
d0-14	30014	0X3000:15	reserve		
d0-15	30015	0X3000:16	Electric motor angle		
d0-16	30016	0X3000:17	bus voltage		
d0-17	30017	0X3000:18	Historical lowest bus voltage		
d0-18	30018	0X3000:19	Historical highest bus voltage		
d0-19	30019	0X3000:20	Drive temperature		
d0-20	30020	0X3000:21	Encoder fault counting		
d0-21	30021	0X3000:22	Target position high		
d0-22	30022	0X3000:23	Target position low		
d0-23~ d0-27	30023~ 30027	0X3000:24~0 X3000:28	reserve		
d0-28	30028	0X3000:29	Motor overload rate	Motor overload rate	
d0-29~ d0-32	30029~ 30032	0X3000:30~ 0X3000:33	reserve		
d0-33	30033	0X3000:34	The original value of U-phase current sampling		
d0-34	30034	0X3000:35	The original value of V-phase current sampling		
d0-35	30035	0X3000:36	reserve		
d0-36	30036	0X3000:37	Motor torque feedback		
d0-37	30037	0X3000:38	reserve		
d0-38	30038	0X3000:39	Motor torque given		
d0-39~ d0-50	30039~ 30050	0X3000:40~ 0X3000:51	reserve		
d0-51	30051	0X3000:52	EtherCAT maximum communication cycle		
d0-52	30052	0X3000:53	EtherCAT real-time communication cycle		
d0-53~ d0-91	30053~ 30091	0X3000:54~ 0X3000:92	reserve		
d0-92	30092	0X3000:93	ECT input port CRC error technology	ECT input port CRC error count	
d0-93	30093	0X3000:94	ECT input port receives error count	ECT input port receives error count	
d0-94	30094	0X3000:95	ECT input port forwarding error count	ECT input port forwarding error count	
d0-95	30095	0X3000:96	ECT input port frame drop count	ECT input port frame drop count	

d0-96	30096	0X3000:97			
d0-97	30097	0X3000:98	Software version-year		
d0-98	30098	0X3000:99	Software version-month day		
d0-99	30099	0X3000:100	Software version-SN		

7.1.3.6 Alarm code and description

ErrCode	Alarm code and description			
Function Codes	**ETHERCAT code**	**Function Codes name**	**Parameter Description**	**Can it be reset**
Er.001	0xFF01	Emergency stop alarm	The DI terminal of the drive has an emergency stop signal input	
Er.002	0xFF02	Overcurrent	Motor code error, encoder cable not corresponding to motor, UVW short-circuit, ground short-circuit, power module drive undervoltage, drive ground short-circuit damage (caused by one phase of UVW not being grounded). Clear the alarm after powering on again	
Er.003	0xFF03	reserve		
Er.004	0xFF04	External busbar disconnection	Not connected to the DC bus	
Er.005	0xFF05	overload	Motor code error, motor brake not opened, motor load locked-rotor, motor phase loss, motor selection too small, excessive load, etc	
Er.006	0xFF06	reserve		
Er.007	0xFF07	Motor initialization in progress	The motor encoder is not connected, the encoder cable is abnormal (wiring error), the encoder protocol is abnormal (the motor encoder protocol corresponding to the motor code does not match the actual connected encoder), the current sampling is abnormal, etc	
Er.008	0xFF08	reserve		
Er.009	0xFF09	Abnormal three-phase current	The motor is not connected, the motor is missing phase, the motor phase sequence is incorrect, the motor code is set incorrectly, the power supply voltage of the drive is low, the load exceeds the allowable value at high motor speed, and the drive gain parameter is abnormal	
Er.010	0xFF0A	reserve		
Er.011	0xFF0B	Bus undervoltage	Low voltage of the power grid, poor input contact of the drive main circuit, etc. Alarm when bus voltage is below 185V	
Er.012	0xFF0C	Bus overvoltage	Failure to connect the braking resistor, high resistance of the braking resistor, and excessive feedback energy from the load. Alarm when bus voltage exceeds 395V	
Er.013	0xFF0D	Position instruction too large	The increment of the master station position command is too large, the unit setting of the master station encoder is incorrect, the synchronization period (Px. 50) is set incorrectly, the drive is not set to absolute value type, resulting in the loss of reference point after power on, and the electronic gear parameter setting is incorrect	
Er.014	0xFF0E	reserve		
Er.015	0xFF0F	Drive overheating	The ambient temperature is too high, the installation environment is not adequately ventilated, and the drive fan is damaged. Drive temperature above 85 ° C alarm	
Er.016	0xFF10	Failed to write EEPROM	Incorrect parameter settings, EEPROM abnormal	

Er.017	0xFF11	Read EEPROM failed	EEPROM abnormal	
Er.018	0xFF12	Excessive positional deviation	The position gain setting is too small, the speed gain parameter setting is unreasonable, the load is too heavy, the position deviation alarm threshold setting is too small, the motor locked-rotor, the motor line sequence is incorrect, the motor torque limit is too small, etc	
Er.019	0xFF13	reserve		
Er.020	0xFF14	Encoder error	Encoder communication abnormality, unreliable encoder wiring, encoder interference	
Er.021	0xFF15	Abnormal speed measurement	Abnormal speed measurement, encoder interference, encoder abnormality	
Er.022	0xFF16	Encoder initialization in progress	Encoder not connected, unreliable encoder wiring	
Er.023	0xFF17	reserve		
Er.024	0xFF18	External bus error	External module alarm input	
Er.025	0xFF19	reserve		
Er.026	0xFF1A	reserve		
Er.027	0xFF1B	EEPROM Parameter verification error	EEPROM abnormal	
Er.028	0xFF1C	reserve		
Er.029	0xFF1D	reserve		
Er.030	0xFF1E	reserve		
Er.031	0xFF1F	Alarm clearing too frequently	Clear alarms multiple times in a short period of time	
Er.032	0xFF20	Parameter initialization error	EERPOM parameters need to be initialized and restored to factory settings	
Er.033	0xFF21	EtherCAT COMMUNICATION ERROR	The master station is not connected, disconnected, the EtherCAT network cable is unreliable, and the EtherCAT network cable is interfered with	
Er.034	0xFF22	battery failure	The battery voltage is below 3.0V, or the encoder battery is not connected; Note: If the battery is not replaced, the alarm will sound again after running for 1 minute after resetting the fault.	
Er.035	0xFF23	reserve		
Er.036	0xFF24	Multiple circles lost	The absolute value encoder is not connected to the battery, or multiple cycles of information are lost due to plugging and unplugging when the battery is present。Alarm for battery voltage below 2.5V. When the alarm is triggered, DS402 statusword bit3=1, controlword set to 0x80 cannot be cleared, controlword bit 12 must be set to 1 to clear. After successful clearing, statusword bit3=0	
Er.037	0xFF25	reserve		
Er.038	0xFF26	Motor code recognition error	The motor code has not been written into the motor, and the motor power does not match the driving power	
Er.039	0xFF27	reserve		
Er.040	0xFF28	Encoder speed measurement abnormality	Abnormal motor encoder, incorrect motor code setting	
Er.041	0xFF29	reserve		
Er.042	0xFF2A	Electric motor racing car	Abnormal motor encoder, incorrect motor proxy settings, incorrect motor	

			phase sequence, excessive external load	
Er.043	0xFF2B	reserve		
Er.044	0xFF2C	INSTANTANEOUS OVERCURRENT	Motor phase sequence error, motor phase loss, motor locked-rotor, incorrect motor code setting, motor output short-circuit to ground	
Er.045	0xFF2D	reserve		
Er.046	0xFF2E	Instantaneous short-circuit	Motor phase sequence error, motor phase loss, motor locked-rotor, incorrect motor code setting, motor output short-circuit to ground	
Er.047	0xFF2F	reserve		
Er.048	0xFF30	The motor power line is not connected	Poor contact or disconnection of motor power line	
Er.049	0xFF31	reserve		
Er.050	0xFF32	Positive limit trigger	The DI terminal of the drive has a positive limit signal input	
Er.051	0xFF33	Negative limit triggered	The DI terminal of the drive has a negative limit signal input	
Er.052	0xFF34	Double STO trigger	Both safe torque offions are triggered	
Er.053	0xFF35	STO1 trigger	The first safety torque turn-off trigger	
Er.054	0xFF36	STO2 trigger	The second safety torque turn-off trigger	
Er.055	0xFF37	STO detection error	Safety torque shutdown hardware detection error	
Er.056	0xFF38	Anti collision signal triggered	Anti collision signal triggered	
Er.057~ Er.100	0xFF31~ 0xFF64	reserve		
Er.227	0xFFE3	Hardware encryption error	Drive hardware that has not undergone hardware decryption or piracy	

7.1.4 Drive Module Axis 2 Servo Parameter Group

7.1.4.1 Basic parameter group

P0 group	Basic parameter group

Function code	MODBUS mapping address	ETHERCAT mapping address	Function Codes name	Parameter Description	Set range	Unit	Factory value	Attribute	Associated mode
P0-00	22000	0X2100:01	Software version	Software version	0~65535		1000	R	
P0-01	22001	0X2100:02	Drive model	4:S5R0（5.0A）220V 5:S8R0（8.0A）220V 6:S015（15A）220V 7~8:reserve	4~8		4	■	
P0-02	22002	0X2100:03	Motor code	Motor ID:1000~3500	1000~ 3500		1400	■	
P0-03	22003	0X2100:04	Parameter management	Units、Tens:reserve Hundreds:restore factory parameters 0:No action 1:Restore factory Settings (automatically reset to zero after completion) Thousands:reserve	0x0000~ 0x1111		0x0000	H/■	P.S.T

P0-04	22004	0X2100:05	Manufacturer's functional parameters	0:Prohibit modifying P0-06/07 parameters 1:Allow modification of P0-06/07 parameters	0~1		0		
P0-05	22005	0X2100:06	Maximum speed threshold	0~6000	0~6000	rpm	4500		
P0-06	22006	0X2100:07	Forward maximum torque limit	0~300	0~300	%	300		
P0-07	22007	0X2100:08	Reverse maximum torque limit	0~300	0~300	%	300		
P0-08	22008	0X2100:09	Motor direction logic	0:Take CCW direction as the forward rotation direction 1:Take CW direction as the forward rotation direction	0~1		0	■	
P0-09	22009	0X2100:10	Encoder type setting	Units:Encoder type 0:Incremental type 1:Multi-turn absolute value type 2:Single-turn absolute value type Tens: Bit0:0:Turn off the abnormal alarm of the speed measurement 1:Activate the abnormal alarm for speed measurement Bit1:0:Turn off the flying car alarm 1:Activate the flying car alarm Bit2:0:Turn off the software short-circuit alarm 1:Enable the software short-circuit alarm Hundreds: Bit4:0:Ethercat speed unit selectionrpm 1:Ethercat speed unit selectionpp/s Thousands:Motor code recognition	0x0000~ 0x2113				
P0-10	22010	0X2100:11	control mode	0:TRQ 1:SPD 2:POS 3:EtherCAT 4:Longmen Follow Mode	0~13		0		PS
P0-11	22011	0X2100:12	Brake ON delay time	The delay time from the servo receiving the Servo On instruction to the brake On	100~500	ms	100	■	P.S.T
P0-12	22012	0X2100:13	Static state, brake OFF - servo OFF	The delay time from when the servo receives the Servo Off instruction to when the motor is not	1~1000	ms	100	■	P.S.T

			delay	powered on					
P0-13	22013	0X2100:14	reserve						
P0-14	22014	0X2100:15	reserve						
P0-15	22015	0X2100:16	Overload protection coefficient of motor	10~100	10~100	%	50		
P0-16	22016	0X2100:17	USB monitoring settings	Units:USB low-speed monitoring sampling interval, unit ms(0~5) 0~5 Tens:USB monitoring mode setting 0:Close monitoring 1:Low-speed monitoring 2:High speed monitoring, sampling frequency 8k 3:High speed monitoring, sampling frequency 16k Hundreds:reserve Thousands:reserve	0x0000~ 0x0035		0x0000	H/■	P.S.T
P0-17	22017	0X2100:18	Keyboard enables control word	0:Servo OF,1:Servo ON	0~1		0	■	
P0-18	22018	0X2100:19	External emergency stop control	Units:External emergency stop alarm detection enabled 0:Do not detect external emergency stop signals 1:Detecting external emergency stop signals Tens:Associated alarm enable 0:Do not enable associated alarms 1:Enable associated alarm	0x0000~ 0x0011		0	■	
P0-19	22019	0X2100:20	reserve						
P0-20	22020	0X2100:21	Load inertia ratio	The ratio of load inertia to motor inertia	0~3000	%	100		S
P0-21	22021	0X2100:22	Velocity loop gain	The larger the response, the faster the response. If it is too large, it will cause vibration. The position mode and position loop gain will be adjusted in coordination	20~2000 0	0.1 Hz	800		S
P0-22	22022	0X2100:23	velocity loop integral time constant	The larger the integral, the stronger the integration effect, and the stronger the speed tracking ability, which needs to be coordinated with the velocity loop gain and position loop gain	0~ 20000	0.1 Hz	10		S
P0-23	22023	0X2100:24	Position loop gain	The larger the response, the faster the response. If it is too large, it will	20~ 20000	0.1 Hz	200		P

				cause vibration. The position mode and position loop gain will be adjusted in coordination					
P0-24	22024	0X2100:25	The second velocity loop gain	The larger the response, the faster the response. If it is too large, it will cause vibration. The position mode and position loop gain will be adjusted in coordination	20~ 20000	0.1 Hz	800		S
P0-25	22025	0X2100:26	The integral time constant of the second velocity loop	The smaller the value, the stronger the integration effect, and the stronger the speed tracking ability, which needs to be coordinated with the velocity loop gain and position loop gain	20~ 1000.0	0.1 Hz	125		S
P0-26	22026	0X2100:27	The second Position loop gain	The larger the response, the faster the response. If it is too large, it will cause vibration. The position mode and position loop gain will be adjusted in coordination	20~ 2000.0	0.1 Hz	200		P
P0-27	22027	0X2100:28	Speed feedforward selection	Units:Speed feedforward selection 0:Internal speed feedforward(P0-28) 1:External given Tens:Torque feedforward selection 0:Internal torque feedforward 1:External given Hundreds:Multi segment gain selection 0:Default first set of gain parameters 1:Switching between two sets of gains based on (P0-72,73) Thousands:Torque limit selection 0:Internal limit (P0-06,07) 1:External Limiting - Object Dictionary 0x6072- Axis 1	0x0000~ 0x1111		0	■	P
P0-28	22028	0X2100:29	Speed feedforward gain	Increasing can reduce the steady-state position deviation; excessive increase will cause overshoot	0~100	%	0		P
P0-29	22029	0X2100:30	Speed feedforward smoothing filter constant	Smooth the speed feedforward quantity and coordinate with the speed feedforward gain for regulation	0~64.0	ms	0		P
P0-30	22030	0X2100:31	reserve	reserve	50~1000		100		P

P0-31	22031	0X2100:32	DI1function	Units&Tens: 00~05:reserve 08:Emergency stop 09:Axis 1 origin switch 0A:Axis 2 origin switch 0B:Axis 3 origin switch 0C:Axis 1 forward limit 0D:Axis 2 forward limit 0E:Axis 3 forward limit 0F:Axis 1 negative limit 10:Axis 2 negative limit 11:Axis 3 negative limit 12:Axis 1 probe 1 13:Axis 2 probe 1 14:Axis 3 probe 1 15:Axis 1 probe 2 16:Axis 2 probe 2 17:Axis 3 probe 2 Hundreds: 0:Positive logic 1:Negative logic	0x0000~ 0x0117		000D		
P0-32	22032	0X2100:33	DI2function	Same as P0-31	0x0000~ 0x0117		0010		
P0-33	22033	0X2100:34	DI3function	Same as P0-31	0x0000~ 0x0117		000A		
P0-34	22034	0X2100:35	DI4function	Same as P0-31	0x0000~ 0x0117		0013		
P0-35	22035	0X2100:36	DI5function	Same as P0-31	0x0000~ 0x0117		0016		
P0-36	22036	0X2100:37	reserve	reserve					
P0-37	22037	0X2100:38	DI filtering time(DI1~DI6)	0~32ms	0~32		0		
P0-38	22038	0X2100:39	Electronic gear selection	0:Set value using object dictionary 0x6091 1:Use P0-39 (high) and P0-40 (low) values	0~1		0		
P0-39	22039	0X2100:40	Number of position command pulses per motor revolution (high-order bits)	0~20000	0~20000		838	■	P
P0-40	22040	0X2100:41	Number of position command pulses per motor revolution (low-order bits)	0~9999 Pulse per revolution=(P0-39)*10000+(P0-40)	0~9999		8608	■	P

P0-41	22041	0X2100:42	Moving average filter constant	--	0~200.0	ms	0		P
P0-42	22042	0X2100:43	First-order low-pass filter constant	--	0~6000.0	ms	0		P
P0-43	22043	0X2100:44	reserve	--	0~65535		0	L	P
P0-44	22044	0X2100:45	reserve	--	0~16384		2		
P0-45	22045	0X2100:46	reserve	--	0~65535		10000	L	P
P0-46	22046	0X2100:47	reserve	--	0~16384		0		
P0-47	22047	0X2100:48	reserve	--	4~16384		2500	■	P
P0-48	22048	0X2100:49	reserve	--	0x0000~ 0x0001		0x0000	H/■	P
P0-49	22049	0X2100:50	Position deviation limit	0.1~50.0circles	0.1~50.0		10.0	■	
P0-50	22050	0X2100:51	EtherCAT synchronization cycle	1~256 (x0.125ms)=[0.125ms~32ms]	1~256	0.125/ ms	8		
P0-51	22051	0X2100:52	Compensation value for CCW direction of quadrant protrusion	0~1000‰	0~1000		0		
P0-52	22052	0X2100:53	Compensation value for CW direction of quadrant protrusion	0~1000‰	0~1000		0		
P0-53	22053	0X2100:54	Quadrant bulge compensation delay	0~1000ms	0~1000		0		
P0-54	22054	0X2100:55	Quadrant bulge compensation filtering	0~100ms	0~100		0		
P0-55	22055	0X2100:56	Gravity compensation value	0~1000‰	0~1000		0		
P0-56	22056	0X2100:57	Gravity compensation polarity	0:CCW direction compensation 1:CW direction compensation	0~1		0		
P0-57	22057	0X2100:58	Frequency of notch filter	10-5000 Hz	10~5000		100		
P0-58	22058	0X2100:59	Depth of notch filter	0~20	0~20		10		
P0-59	22059	0X2100:60	Notch filter gain	0~500%	0~500		0		
P0-60	22060	0X2100:61	Zero offset of magnetic pole	0~2048,<<12	0~2048		253		
P0-61	22061	0X2100:62	Speed	Speed mode instruction Pn	0~4500	rpm	100		

			command (for debugging)	parameter instruction given					
P0-62	22062	0X2100:63	reserve						
P0-63	22063	0X2100:64	reserve						
P0-64	22064	0X2100:65	reserve						
P0-65	22065	0X2100:66	Ud-Kp	130	0~800		50		
P0-66	22066	0X2100:67	Ud-Ki	25	0~500		25		
P0-67	22067	0X2100:68	Uq-Kp	130	0~300		50		
P0-68	22068	0X2100:69	Uq-Ki	25	0~300		25		
P0-69	22069	0X2100:70	reserve						
P0-70	22070	0X2100:71	Speed command polarity	0~1	0~1		0		
P0-71	22071	0X2100:72	Servo adaptive rigidity	20~20000（Prevent nodding phenomenon during the enabling process under gravity or load conditions	20~20000		1200	▲	
P0-72	22072	0X2100:73	The first set of gain speed inflection points	/	0~6000	rpm	6000		
P0-73	22073	0X2100:74	The Second set of gain speed inflection points	/	0~6000	rpm	6000		
P0-74 ~P0-79	22074~ 22079	0X2100:75~ 0X2100:80	reserve						
P0-80	22080	0X2100:81	One click aging parameters		0~6		0		
P0-81	22081	0X2100:82	Internal function switch	Units:Busbar voltage correlation adjustment enabled 0:Close 1:Enable Tens:Dead zone compensation enabled 0:Close 1:Enable Hundreds:Peak current suppression 0:Close 1:Enable Thousands:reserve 0:Normal mode	0x0000~ 0x111		0x0000	H	P.S.T
P0-82	22082	0X2100:83	Manufacturer calibration mode	Units:Manufacturer's current calibration mode 0:Close 1:Enable, For internal motor calibration by the manufacturer	0x0000~ 0x0001		0x0000	H	PST

				only Other:reserve					
P0-83	22083	0X2100:84	reserve						
P0-84	22084	0X2100:85	VDC calibration	27800~37683	27800~ 37683		27800	K	P.S.T
P0-85	22085	0X2100:86	High position of serial number (first test year)	2015~2029	2015~ 2029		2017	K	P.S.T
P0-86	22086	0X2100:87	Median of serial number (first test month day)	0101~1231	0101~ 1231		907	K	P.S.T
P0-87	22087	0X2100:88	Low position of serial number (first test serial number)	0x0000~0xFFFF	0x0000~ 0xFFFF		0x0000	H/K	P.S.T
P0-88	22088	0X2100:89	Single board tooling testing QC label	0xA7E3:Pass other:NG	0x0000~ 0xFFFF		0x0000	H/K	P.S.T
P0-89	22089	0X2100:90	Test the QC label before aging	0x8F68:Pass other:NG	0x0000~ 0xFFFF		0x0000	H/K	P.S.T
P0-90	22090	0X2100:91	12-hour aging test label	0x5A5A:Pass other:NG	0x0000~ 0xFFFF		0x0000	H/K	P.S.T
P0-91	22091	0X2100:92	Test label for the entire machine after aging	0xB80F:Pass other:NG	0x0000~ 0xFFFF		0x0000	H/K	P.S.T
P0-92	22092	0X2100:93	Function password	E5DA:Clear encoder multi-turn value	0x0000~ 0xFFFF		0x0000	H/K	P.S.T
P0-93	22093	0X2100:94	reserve						
P0-94	22094	0X2100:95	reserve	reserve					
P0-95	22095	0X2100:96	reserve	reserve	0x0000~ 0xFFFF		0x0000	H/K	P.S.T
P0-96	22096	0X2100:97	reserve	reserve	0x0000~ 0xFFFF		0x0000	H/R/ K	P.S.T
P0-97	22097	0X2100:98	reserve	reserve	0x0000~ 0xFFFF		0x0000	H/R/ K	P.S.T
P0-98	22098	0X2100:99	reserve	reserve	0x0000~ 0xFFFF		0x0000	H/R/ K	P.S.T
P0-99	22099	0X2100:100	reserve	reserve	0x0000~ 0xFFFF		0x0000	H/K	

7.1.4.3 Advanced Debugging Parameter Group

P1 group	Advanced Debugging Parameter Group								
Function code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Setting Range**	**Unit**	**Factory value**	**Attribute**	**Associated mode**
P1-00	22100	0X2101:01	Self-adjusting mode	0:Manual adjustment 1:Rigidity grade adjustment 2:Position loop bandwidth+inertia self adjustment (slowly changing) 3:Position loop bandwidth+inertia self adjustment (rapid change)	0~3		0		
P1-01	22101	0X2101:02	Rigidity grade	Rigidity grade setting	1~32		12		
P1-02	22102	0X2101:03	reserve	reserve	0~65535		0		
P1-03	22103	0X2101:04	Inertia identification mode	0:Internal command round-trip motion mode 1:Controller instruction mode 2:Continuous automatic identification	0~2		0		
P1-04	22104	0X2101:05	Inertia identification completion mark	0:Inertia identification incomplete 1:Inertia identification completed	0~1		0		
P1-05	22105	0X2101:06	Inertia identification maximum speed	Inertia identification allows for maximum operating speed	100~3000	rpm	1000		
P1-06	22106	0X2101:07	Inertia identification acceleration time	Inertia identification speed accelerates from 0 to 5000 revolutions per minute	10~30000	ms	100		
P1-07	22107	0X2101:08	Maximum number of motion cycles for inertia identification	The allowable number of operating cycles for inertia identification	1~50	r	5		
P1-08	22108	0X2101:09	Waiting time for completion of single inertia identification	Waiting time for completion of single inertia identification motion	0~30000	ms	100		
P1-09	22109	0X2101:10	reserve	reserve	0~65535		0		
P1-10	22110	0X2101:11	reserve	reserve	0~65535		0		
P1-11	22111	0X2101:12	reserve	reserve	0~65535		0		
P1-12	22112	0X2101:13	reserve	reserve	0~65535		0		
P1-13	22113	0X2101:14	reserve	reserve	0~65535		0		
P1-14	22114	0X2101:15	reserve	reserve	0~65535		0		
P1-15	22115	0X2101:16	Vibration detection	Vibration detection threshold	0~100		100		

			threshold						
P1-16	22116	0X2101:17	Vibration detection time	Vibration detection time	0~100		50		
P1-17	22117	0X2101:18	Frequency of the first notch filter	Frequency of notch filter	0~65535		5000		
P1-18	22118	0X2101:19	Width of the first notch filter	Width of notch filter	0~65535		2		
P1-19	22119	0X2101:20	Depth of the first notch filter	Depth of notch filter	0~65535		0		
P1-20	22120	0X2101:21	Frequency of the second notch filter	Frequency of notch filter	0~65535		5000		
P1-21	22121	0X2101:22	Width of the second notch filter	Width of notch filter	0~65535		2		
P1-22	22122	0X2101:23	Depth of the second notch filter	Depth of notch filter	0~65535		0		
P1-23	22123	0X2101:24	Frequency of the third notch filter	Frequency of notch filter	0~65535		5000		
P1-24	22124	0X2101:25	Width of the third notch filter	Width of notch filter	0~65535		2		
P1-25	22125	0X2101:26	Depth of the third notch filter	Depth of notch filter	0~65535		0		P
P1-26	22126	0X2101:27	Frequency of the fourth notch filter	Frequency of notch filter	0~65535		5000		P
P1-27	22127	0X2101:28	Width of the fourth notch filter	Width of notch filter	0~65535		2		P
P1-28	22128	0X2101:29	Depth of the fourth notch filter	Depth of notch filter	0~65535		0		
P1-29	22129	0X2101:30	Frequency of the fifth notch filter	Frequency of notch filter	0~65535		5000		
P1-30	22130	0X2101:31	Width of the fifth notch filter	Width of notch filter	0~65535		2		S
P1-31	22131	0X2101:32	Depth of the fifth notch filter	Depth of notch filter	0~65535		0		S
P1-32	22132	0X2101:33	End vibration suppression frequency	End positioning vibration suppression frequency	0~65535		2000		S
P1-33	22133	0X2101:34	End vibration suppression frequency compensation	End vibration suppression frequency compensation	0~200		100		S
P1-34	22134	0X2101:35	Maximum allowable weak magnetic current	Maximum allowable weak magnetic current	0~100		50		S
P1-35	22135	0X2101:36	Weak magnetic enablement	0:shut down the weak magnetic function 1:Enable weak magnetic function	0~1		0		S
P1-36	22136	0X2101:37	Weak magnetic gain	Weak magnetic gain	0~300		100%		S
P1-37	22137	0X2101:38	Weak magnetic point velocity	Enable weak magnetic control speed	0~6000		4000		P
P1-38	22138	0X2101:39	PDFF control gain coefficient	PDFF control gain coefficient	0~100		100		
P1-39	22139	0X2101:40	reserve						
P1-40	22140	0X2101:41	reserve						T
P1-41	22141	0X2101:42	reserve						T

P1-42	22142	0X2101:43	Disturbance compensation time coefficient	Disturbance compensation time coefficient	0~40000	0.1 Hz	15.0		T
P1-43	22143	0X2101:44	Disturbance cut-off frequency	Disturbance cut-off frequency	0~40000	0.1 Hz	400.0		T
P1-44	22144	0X2101:45	Disturbance compensation gain	Disturbance compensation gain	0~100	%	0.0		T
P1-45	22145	0X2101:46	Disturbance observer inertia correction coefficient	Disturbance observation inertia correction coefficient	0~3000	%	100		
P1-46	22146	0X2101:47	Model tracking control mode	0:Do not use model tracking control 1:Activate model tracking control + rigid body model 2:Enable model tracking control+dual inertia model	0~300	%	10		
P1-47	22147	0X2101:48	Model tracking control gain	Model tracking control gain	0~30000	0.1 Hz	400		
P1-48	22148	0X2101:49	Model tracking control compensation gain	Model tracking control compensation gain	0~200	%	100		
P1-49	22149	0X2101:50	Double inertia model resonance frequency	Double inertia model resonant frequency	1~100		1		
P1-50	22150	0X2101:51	Double inertia model resonance frequency	Double inertia model anti-resonant frequency	100~6000	rpm	3000		
P1-51	22151	0X2101:52	Double inertia model velocity feedforward value	Double inertia model velocity feedforward value	0~100	%	0		
P1-52	22152	0X2101:53	Doublel inertia model torque feedforward value	Doublel inertia model torque feedforward value	0~100	%	0		
P1-53	22153	0X2101:54	reserve						
P1-54	22154	0X2101:55	reserve						
P1-55	22155	0X2101:56	Torque ripple suppression frequency	Torque ripple suppression frequency	1~50000	0.1 Hz	400		
P1-56	22156	0X2101:57	Torque ripple suppression compensation	Torque ripple suppression compensation	0~100	%	0		
P1-57	22157	0X2101:58	Torque ripple suppression phase	Torque ripple suppression phase	0~2048		0		
P1-58	22158	0X2101:59	Torque command filtering cut-off frequency	Torque command filtering cut-off frequency	1~16000	Hz	4000		
P1-59~ P1-99	22159~ 22199	0X2101:60~ 0X2101:100	reserve						

7.1.4.2 Motor parameter group

P2 group	Motor parameter group								
Function code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Setting Range**	**Unit**	**Factory value**	**Attribute**	**Associated mode**
P2-00	22200	0X2102:01	Rated power of motor	Rated power of motor	1~65535	0.001 kw	75	R	
P2-01	22201	0X2102:02	Rated current of motor	Rated current of motor	1~65535	0.01 A	500	R	S
P2-02	22202	0X2102:03	Maximum current of motor	Maximum current of motor	1~65535	0.01 A	500	R	S
P2-03	22203	0X2102:04	Rated speed of motor	Rated speed of motor	100~6000	rpm	3000	R	P
P2-04	22204	0X2102:05	Maximum speed of motor	Maximum speed of motor	100~6000	rpm	6000	R	S
P2-05	22205	0X2102:06	Rated torque of motor	Rated torque of motor	10~65535	0.01 Nm	239	R	S
P2-06	22206	0X2102:07	Maximum torque of motor	Maximum torque of motor	10~65535	0.01 Nm	716	R	S
P2-07	22207	0X2102:08	Maximum speed torque value of motor	Maximum speed torque value of motor	10~65535	0.01 Nm	716	R	P
P2-08	22208	0X2102:09	Number of motor poles	Number of motor poles	2~100		5	R	S
P2-09	22209	0X2102:10	Motor back electromotive force coefficient	Motor back electromotive force coefficient	1~65535	0.01 mV/rpm	3330	R	
P2-10	22210	0X2102:11	Motor torque constant	Motor torque constant	1~65535	0.01 Nm/Arms	51	R	
P2-11	22211	0X2102:12	Motor rotor inertia	Motor rotor inertia	1~65535	0.01 kg.cm2	130	R	
P2-12	22212	0X2102:13	Motor D-axis inductance	Motor D-axis inductance	1~65535	0.01 mH	387	R	
P2-13	22213	0X2102:14	Motor Q-axis inductance	Motor Q-axis inductance	1~65535	0.01 mH	327	R	
P2-14	22214	0X2102:15	Motor stator resistance	Motor stator resistance	1~65535	0.001Ω	500	R	
P2-15	22215	0X2102:16	Electrical time constant of motor	Electrical time constant of motor	1~65535	0.01 ms	654	R	
P2-16	22216	0X2102:17	Mechanical time constant of motor	Mechanical time constant of motor	1~65535	0.01 ms	24	R	
P2-17	22217	0X2102:18	Motor zero offset	Motor zero offset	1~65535		205	R	
P2-18~ P2-49	22218~ 22249	0X2102:19~ 0X2102:50	reserve	reserve	0~65535		0		
P2-50	22250	0X2102:51	Internal position mode acceleration and deceleration time	Internal position mode speed accelerates from 0 to maximum speed time	10~60000	ms	500		
P2-51	22251	0X2102:52	Internal position mode	Internal position mode	0~65535	p	0		

			position 1 high	position instruction 1 position					
P2-52	22252	0X2102:53	Internal position mode position 1 low						
P2-53	22253	0X2102:54	Internal position mode position 2 high	Internal position mode position instruction 2 position	0~65536	p	0		
P2-54	22254	0X2102:55	Internal position mode position 2 low						
P2-55~ P2-59	22255~ 22259	0X2102:56~ 0X2102:60	reserve	reserve	0~65535		0		
P2-60	22260	0X2102:61	Black box channel 1 configuration	Configure the black box data recording channel	0~96		34		
P2-61	22261	0X2102:62	Black box channel 2 configuration	Configure the black box data recording channel	0~96		35		
P2-62	22262	0X2102:63	Black box channel 3 configuration	Configure the black box data recording channel	0~96		38		
P2-63	22263	0X2102:64	Black box channel 4 configuration	Configure the black box data recording channel	0~96		41		
P2-64	22264	0X2102:65	Internal sweep frequency mode selection	0:Open-loop mode 1:Closed-loop mode	0~1		0		
P2-65	22265	0X2102:66	Sweep frequency starting frequency	Sweep frequency starting frequency	0~4000	Hz	0		
P2-66	22266	0X2102:67	Sweep frequency cut-off frequency	Sweep frequency cut-off frequency	0~4000	Hz	1000		
P2-67	22267	0X2102:68	Sweep frequency time	Sweep frequency time	0~1000	s	10		
P2-68	22268	0X2102:69	Sweep frequency current excitation amplitude	Sweep frequency current excitation amplitude	0~100	%	30		
P2-69~ P2-99	22269~ 22299	0X2102:70~ 0X2102:100	reserve	reserve	0~65535		0		

7.1.4.4 Functional parameter group

P3 group	Functional parameter group								
Func-tion code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function name**	**Parameter Description**	**Setting Range**	**Unit**	**Factory value**	**Attri-bute**	**Asso-ciated mode**
P3-00~ P3-17	22300~ 22317	0X2103:01~ 0X2103:18	reserve	reserve	0~65535		0		
P3-18	22318	0X2103:19	DO1 function Settings	Units&Tens:Function Settings 00:No function 01:Axis 1 reserved state 02:Axis 2 reserved state 03:Axis 3 reserved state 04:Axis 1 enable Status 05:Axis 2 enable Status 06:Axis 3 enable Status 07:Axis 1 alarm status 08:Axis 2 alarm status 09:Axis 3 alarm status 0A: ETHERCAT virtual output DO1 0B: ETHERCAT virtual output DO2 0C: ETHERCAT virtual output DO3 0D: ETHERCAT virtual output DO4 0E: ETHERCAT virtual output DO5 0F: ETHERCAT virtual output DO6 10: ETHERCAT virtual output DO7 11: ETHERCAT virtual output DO8 Hundreds&Thousands: 00:Positive logic 01:Negative logic	0x0000 ~ 0x0111		0x0000		
P3-19	22319	0X2103:20	DO2 function Settings	Same as P3-18	0x0000 ~ 0x0111		0x0000		
P3-20	22320	0X2103:21	DO3 function Settings	Same as P3-18	0x0000 ~ 0x0111		0x0000		
P3-21	22321	0X2103:22	DO4 function Settings	Same as P3-18	0x0000 ~ 0x0111		0x0000		

P3-22	22322	0X2103:23	DO5 function Settings	Same as P3-18	0x0000 ~ 0x0111		0x0000		
P3-23	22323	0X2103:24	DO6 function Settings	Same as P3-18	0x0000 ~ 0x0111		0x0000		
P3-24	22324	0X2103:25	DO7 function Settings	Same as P3-18	0x0000 ~ 0x0111		0x0000		
P3-25	22325	0X2103:26	DO8 function Settings	Same as P3-18	0x0000 ~ 0x0111		0x0000		
P3-26~ P3-99	22326~ 22399	0X2103:27~ 0X2103:100	reserve	reserve	0~65535		0		

7.1.4.5 Monitoring parameter group

d0 group	Monitoring parameter group				
Func-tion code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Unit**
d0-00	32000	0X3100:01	Motor speed		rpm
d0-01	32001	0X3100:02	reserve		
d0-02	32002	0X3100:03	DIDO status monitoring	Low 8 indicates DI1~DI8, while high 8 indicates DO1~DO8	
d0-03	32003	0X3100:04	The encoder position feeds back the low bit		
d0-04	32004	0X3100:05	The encoder position feeds back the high bit		
d0-05	32005	0X3100:06	Positional deviation		
d0-06	32006	0X3100:07	q-axis voltage		
d0-07	32007	0X3100:08	Bus synchronization correction cycle	Bus synchronization correction cycle	
d0-08	32008	0X3100:09	d-axis voltage		
d0-09	32009	0X3100:10	Average load rate		
d0-10	32010	0X3100:11	Multi-circle position		
d0-11	32011	0X3100:12	Encoder obtains motor code	Encoder obtains motor code	
d0-12	32012	0X3100:13	Position command high position		
d0-13	32013	0X3100:14	Position command low position		
d0-14	32014	0X3100:15	reserve		
d0-15	32015	0X3100:16	Electric motor angle		
d0-16	32016	0X3100:17	bus voltage		
d0-17	32017	0X3100:18	Historical lowest bus voltage		
d0-18	32018	0X3100:19	Historical highest bus voltage		
d0-19	32019	0X3100:20	Drive temperature		
d0-20	32020	0X3100:21	Encoder fault counting		
d0-21	32021	0X3100:22	Target position high		
d0-22	32022	0X3100:23	Target position low		
d0-23~ d0-27	32023~ 32027	0X3100:24~ 0X3100:28	reserve		
d0-28	32028	0X3100:29	Motor overload rate	Motor overload rate	
d0-29~ d0-32	32029~ 32032	0X3100:30~ 0X3100:33	reserve		
d0-33	32033	0X3100:34	The original value of U-phase current sampling		
d0-34	32034	0X3100:35	The original value of V-phase current sampling		
d0-35	32035	0X3100:36	reserve		
d0-36	32036	0X3100:37	Motor torque feedback		
d0-37	32037	0X3100:38	reserve		
d0-38	32038	0X3100:39	Motor torque given		
d0-39~ d0-50	32039~ 32050	0X3100:40~ 0X3100:51	reserve		
d0-51	32051	0X3100:52	EtherCAT maximum communication cycle		

d0-52	32052	0X3100:53	EtherCAT real-time communication cycle		
d0-53~ d0-91	32053~ 32091	0X3100:54~ 0X3100:92	reserve		
d0-92	32092	0X3100:93	ECT output port CRC error technology	ECT output port CRC error count	
d0-93	32093	0X3100:94	ECT output port receives error count	ECT output port receives error count	
d0-94	32094	0X3100:95	ECT output port forwarding error count	ECT output port forwarding error count	
d0-95	32095	0X3100:96	ECT output port frame drop count	ECT output port frame drop count	
d0-96	32096	0X3100:97	reserve		
d0-97	32097	0X3100:98	Software version-year		
d0-98	32098	0X3100:99	Software version-month day		
d0-99	32099	0X3100:100	Software version-SN		

7.1.4.6 Alarm code and description

Err Code	**Alarm code and description**			
Function Codes	**ETHERCAT code**	**Function Codes name**	**Parameter Description**	**Can it be reset**
Er.001	0xFF01	Emergency stop alarm	The DI terminal of the drive has an emergency stop signal input	
Er.002	0xFF02	Overcurrent	Motor code error, encoder cable not corresponding to motor, UVW short-circuit, ground short-circuit, power module drive undervoltage, drive ground short-circuit damage (caused by one phase of UVW not being grounded). Clear the alarm after powering on again	
Er.003	0xFF03	reserve		
Er.004	0xFF04	External busbar disconnection	Not connected to the DC bus	
Er.005	0xFF05	overload	Motor code error, motor brake not opened, motor load locked-rotor, motor phase loss, motor selection too small, excessive load, etc	
Er.006	0xFF06	reserve		
Er.007	0xFF07	Motor initialization in progress	The motor encoder is not connected, the encoder cable is abnormal (wiring error), the encoder protocol is abnormal (the motor encoder protocol corresponding to the motor code does not match the actual connected encoder), the current sampling is abnormal, etc	
Er.008	0xFF08	reserve		
Er.009	0xFF09	Abnormal three-phase current	The motor is not connected, the motor is missing phase, the motor phase sequence is incorrect, the motor code is set incorrectly, the power supply voltage of the drive is low, the load exceeds the allowable value at high motor speed, and the drive gain parameter is abnormal	
Er.010	0xFF0A	reserve		
Er.011	0xFF0B	Bus undervoltage	Low voltage of the power grid, poor input contact of the drive main circuit, etc. Alarm when bus voltage is below 185V	
Er.012	0xFF0C	Bus overvoltage	Failure to connect the braking resistor, high resistance of the braking resistor, and excessive feedback energy from the load. Alarm when bus voltage exceeds 395V	
Er.013	0xFF0D	Position instruction too large	The increment of the master station position command is too large, the unit setting of the master station encoder is incorrect, the synchronization period (Px. 50) is set	

			incorrectly, the drive is not set to absolute value type, resulting in the loss of reference point after power on, and the electronic gear parameter setting is incorrect	
Er.014	0xFF0E	reserve		
Er.015	0xFF0F	Drive overheating	The ambient temperature is too high, the installation environment is not adequately ventilated, and the drive fan is damaged. Drive temperature above 85 ° C alarm	
Er.016	0xFF10	Failed to write EEPROM	Incorrect parameter settings, EEPROM abnormal	
Er.017	0xFF11	Read EEPROM failed	EEPROM abnormal	
Er.018	0xFF12	Excessive positional deviation	The position gain setting is too small, the speed gain parameter setting is unreasonable, the load is too heavy, the position deviation alarm threshold setting is too small, the motor locked-rotor, the motor line sequence is incorrect, the motor torque limit is too small, etc	
Er.019	0xFF13	reserve		
Er.020	0xFF14	Coder error	Encoder communication abnormality, unreliable encoder wiring, encoder interference	
Er.021	0xFF15	Abnormal speed measurement	Abnormal speed measurement, encoder interference, encoder abnormality	
Er.022	0xFF16	Coder initialization in progress	Encoder not connected, unreliable encoder wiring	
Er.023	0xFF17	reserve		
Er.024	0xFF18	External bus error	External module alarm input	
Er.025	0xFF19	reserve		
Er.026	0xFF1A	reserve		
Er.027	0xFF1B	EEPROM parameter verification error	EEPROM abnormal	
Er.028	0xFF1C	reserve		
Er.029	0xFF1D	reserve		
Er.030	0xFF1E	reserve		
Er.031	0xFF1F	Alarm clearing too frequently	Clear alarms multiple times in a short period of time	
Er.032	0xFF20	Parameter initialization error	EERPOM parameters need to be initialized and restored to factory settings	
Er.033	0xFF21	EtherCAT COMMUNICATION ERROR	The master station is not connected, disconnected, the EtherCAT network cable is unreliable, and the EtherCAT network cable is interfered with	
Er.034	0xFF22	battery failure	The battery voltage is below 3.0V, or the encoder battery is not connected; Note: If the battery is not replaced, the alarm will sound again after running for 1 minute after resetting the fault.	
Er.035	0xFF23	reserve		
Er.036	0xFF24	Multiple circles lost	The absolute value encoder is not connected to the battery, or multiple cycles of information are lost due to plugging and unplugging when the battery is present。 Alarm for battery voltage below 2.5V. When the alarm is triggered, DS402 statusword bit3=1, controlword set to 0x80 cannot be cleared, controlword bit 12 must be set to 1 to clear. After successful clearing, statusword bit3=0	
Er.037	0xFF25	reserve		

Er.038	0xFF26	Motor code recognition error	The motor code has not been written into the motor, and the motor power does not match the driving power	
Er.039	0xFF27	reserve		
Er.040	0xFF28	Coder Abnormal speed measurement	Abnormal motor encoder, incorrect motor code setting	
Er.041	0xFF29	reserve		
Er.042	0xFF2A	Electric motor racing car	Abnormal motor encoder, incorrect motor proxy settings, incorrect motor phase sequence, excessive external load	
Er.043	0xFF2B	reserve		
Er.044	0xFF2C	INSTANTANEOUS OVERCURRENT	Motor phase sequence error, motor phase loss, motor locked-rotor, incorrect motor code setting, motor output short-circuit to ground	
Er.045	0xFF2D	reserve		
Er.046	0xFF2E	Instantaneous short-circuit	Motor phase sequence error, motor phase loss, motor locked-rotor, incorrect motor code setting, motor output short-circuit to ground	
Er.047	0xFF2F	reserve		
Er.048	0xFF30	The motor power line is not connected	Poor contact or disconnection of motor power line	
Er.049	0xFF31	reserve		
Er.050	0xFF32	Positive limit trigger	The DI terminal of the drive has a positive limit signal input	
Er.051	0xFF33	Negative limit triggered	The DI terminal of the drive has a negative limit signal input	
Er.052	0xFF34	Double STO trigger	Both safe torque offions are triggered	
Er.053	0xFF35	STO1 trigger	The first safety torque turn-off trigger	
Er.054	0xFF36	STO2 trigger	The second safety torque turn-off trigger	
Er.055	0xFF37	STO detection error	Safety torque shutdown hardware detection error	
Er.056	0xFF38	Anti collision signal triggered	Anti collision signal triggered	
Er.057~ Er.100	0xFF31~ 0xFF64	reserve		
Er.227	0xFFE3	Hardware encryption error	Drive hardware that has not undergone hardware decryption or piracy	

7.1.5 Drive Module Axis 3 Servo Parameter Group

7.1.5.1 Basic parameter group

P0 group	Basic parameter group								
Function code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Setting Range**	**Unit**	**Factory value**	**Attribute**	**Associated mode**
P0-00	24000	0X2200:01	Software version	Software version	0~65535		1000	R	
P0-01	24001	0X2200:02	Drive model	4:S5R0（5.0A）220V 5:S8R0（8.0A）220V 6:S015（15A）220V 7~8:reserve	4~8		4	■	
P0-02	24002	0X2200:03	Motor code	Motor ID:1000~3500	1000~3500		1400	■	
P0-03	24003	0X2200:04	Parameter management	Units、Tens:reserve Hundreds:restore factory parameters 0:No action 1:Restore factory Settings (automatically reset to zero after completion) Thousands:reserve	0x0000~0x1111		0x0000	H/■	P.S.T
P0-04	24004	0X2200:05	Manufacturer's functional parameters	0:Prohibit modifying P0-06/07 parameters 1:Allow modification of P0-06/07 parameters	0~1		0		
P0-05	24005	0X2200:06	Maximum speed threshold	0~6000	0~6000	rpm	4500		
P0-06	24006	0X2200:07	Forward maximum torque limit	0~300	0~300	%	300		
P0-07	24007	0X2200:08	Reverse maximum torque limit	0~300	0~300	%	300		
P0-08	24008	0X2200:09	Motor direction logic	0:Take CCW direction as the forward rotation direction 1:Take CW direction as the forward rotation direction	0~1		0	■	

P0-09	24009	0X2200:10	Encoder type setting	Units:Encoder type 0:Incremental type, 1:Multi-turn absolute value type 2:Single-turn absolute value type Tens: Bit0: 0:Turn off the abnormal alarm of the speed measurement 1:Activate the abnormal alarm for speed measurement Bit1: 0:Turn off the flying car alarm 1:Activate the flying car alarm Bit2: 0:Turn off the software short-circuit alarm 1:Enable the software short-circuit alarm Hundreds: Bit4: 0:Ethercat speed unit selectionrpm 1:Ethercat speed unit selectionpp/s Thousands:Motor code recognition	0x0000~ 0x2113				
P0-10	24010	0X2200:11	control mode	0:TRQ 1:SPD 2:POS 3:EtherCAT 4:Longmen Follow Mode	0~13		0		PS
P0-11	24011	0X2200:12	Brake ON delay time	The delay time from the servo receiving the Servo On instruction to the brake On	100~500	ms	100	■	P.S.T
P0-12	24012	0X2200:13	Static state, brake OFF - servo OFF delay	The delay time from when the servo receives the Servo Off instruction to when the motor is not powered on	1~1000	ms	100	■	P.S.T
P0-13	24013	0X2200:14	reserve						
P0-14	24014	0X2200:15	reserve						
P0-15	24015	0X2200:16	Overload protection coefficient of motor	10~100	10~100	%	50		

P0-16	24016	0X2200:17	USB monitoring settings	Units:USB low-speed monitoring sampling interval, unit ms(0~5) 0~5 Tens:USB monitoring mode setting 0:Close monitoring 1:Low-speed monitoring 2:High speed monitoring, sampling frequency 8k 3:High speed monitoring, sampling frequency 16k Hundreds:reserve Thousands:reserve	0x0000~ 0x0035		0x0000	H/■	P.S.T
P0-17	24017	0X2200:18	Keyboard enables control word	0:Servo OF,1:Servo ON	0~1		0	■	
P0-18	24018	0X2200:19	External emergency stop control	Units:External emergency stop alarm detection enabled 0:Do not detect external emergency stop signals 1:Detecting external emergency stop signals Tens:Associated alarm enable 0:Do not enable associated alarms 1:Enable associated alarm	0x0000~ 0x0011		0	■	
P0-19	24019	0X2200:20	reserve						
P0-20	24020	0X2200:21	Load inertia ratio	The ratio of load inertia to motor inertia	0~3000	%	100		S
P0-21	24021	0X2200:22	Velocity loop gain	The larger the response, the faster the response. If it is too large, it will cause vibration. The position mode and position loop gain will be adjusted in coordination	20~ 20000	0.1 Hz	800		S
P0-22	24022	0X2200:23	velocity loop integral time constant	The larger the integral, the stronger the integration effect, and the stronger the speed tracking ability, which needs to be coordinated with the velocity loop gain and position loop gain	0~20000	0.1 Hz	10		S
P0-23	24023	0X2200:24	position loop gain	The larger the response, the faster the response. If it is too large, it will cause vibration. The position mode and position loop gain will be adjusted in coordination	20~ 20000	0.1 Hz	200		P
P0-24	24024	0X2200:25	The second velocity loop gain	The larger the response, the faster the response. If it is too large, it will cause vibration. The position mode and position loop gain will be adjusted in coordination	20~ 20000	0.1 Hz	800		S

P0-25	24025	0X2200:26	The integral time constant of the second velocity loop	The smaller the value, the stronger the integration effect, and the stronger the speed tracking ability, which needs to be coordinated with the velocity loop gain and position loop gain	20~ 1000.0	0.1 Hz	125		S
P0-26	24026	0X2200:27	The second Position loop gain	The larger the response, the faster the response. If it is too large, it will cause vibration. The position mode and position loop gain will be adjusted in coordination	20~ 2000.0	0.1 Hz	200		P
P0-27	24027	0X2200:28	Speed feedforward selection	Units:Speed feedforward selection 0:Internal speed feedforward(P0-28) 1:External given Tens:Torque feedforward selection 0:Internal torque feedforward 1:External given Hundreds:Multi segment gain selection 0:Default first set of gain parameters 1:Switching between two sets of gains based on (P0-72,73) Thousands:Torque limit selection 0:Internal limit（P0-06,07） 1:External Limiting - Object Dictionary 0x6072- Axis 1	0x0000~ 0x1111		0	■	P
P0-28	24028	0X2200:29	Speed feedforward gain	Increasing can reduce the steady-state position deviation; excessive increase will cause overshoot	0~100	%	0		P
P0-29	24029	0X2200:30	Speed feedforward smoothing filter constant	Smooth the speed feedforward quantity and coordinate with the speed feedforward gain for regulation	0~64.0	ms	0		P
P0-30	24030	0X2200:31	reserve	reserve	50~1000		100		P

P0-31	24031	0X2200:32	DI1 function	Units&Tens: 00~05:reserve 08:Emergency stop 09:Axis 1 origin switch 0A:Axis 2 origin switch 0B:Axis 3 origin switch 0C:Axis 1 forward limit 0D:Axis 2 forward limit 0E:Axis 3 forward limit 0F:Axis 1 negative limit 10:Axis 2 negative limit 11:Axis 3 negative limit 12:Axis 1 probe 1 13:Axis 2 probe 1 14:Axis 3 probe 1 15:Axis 1 probe 2 16:Axis 2 probe 2 17:Axis 3 probe 2 Hundreds: 0:Positive logic 1:Negative logic	0x0000~ 0x0117		000E		
P0-32	24032	0X2200:33	DI2 function	Same as P0-31	0x0000~ 0x0117		0011		
P0-33	24033	0X2200:34	DI3 function	Same as P0-31	0x0000~ 0x0117		000B		
P0-34	24034	0X2200:35	DI4 function	Same as P0-31	0x0000~ 0x0117		0014		
P0-35	24035	0X2200:36	DI5 function	Same as P0-31	0x0000~ 0x0117		0017		
P0-36	24036	0X2200:37	reserve	reserve					
P0-37	24037	0X2200:38	DI filtering time(DI1~DI6)	0~32ms	0~32		0		
P0-38	24038	0X2200:39	Electronic gear selection	0:Set value using object dictionary 0x6091 1:Use P0-39 (high) and P0-40 (low) values	0~1		0		
P0-39	24039	0X2200:40	Position corresponding to one rotation of the motor Command pulse number (high bit)	0~20000	0~20000		838	■	P
P0-40	24040	0X2200:41	Position corresponding to one rotation of the motor Instruction	0~9999 Pulse per revolution=(P0-39)*10000+(P0-40)	0~9999		8608	■	P

			pulse count (low bit)						
P0-41	24041	0X2200:42	Moving average filter constant	--	0~200.0	ms	0		P
P0-42	24042	0X2200:43	First-order low-pass filter constant	--	0~6000.0	ms	0		P
P0-43	24043	0X2200:44	reserve	--	0~65535		0	L	P
P0-44	24044	0X2200:45	reserve	--	0~16384		2		
P0-45	24045	0X2200:46	reserve	--	0~65535		10000	L	P
P0-46	24046	0X2200:47	reserve	--	0~16384		0		
P0-47	24047	0X2200:48	reserve	--	4~16384		2500	■	P
P0-48	24048	0X2200:49	reserve	--	0x0000~ 0x0001		0x0000	H/■	P
P0-49	24049	0X2200:50	Position deviation limit	0.1~50.0circles	0.1~50.0		10.0	■	
P0-50	24050	0X2200:51	EtherCAT Synchronization cycle	1~256(x0.125ms)=[0.125ms~32ms]	1~256	0.125 /ms	8		
P0-51	24051	0X2200:52	Compensation value for CCW direction of quadrant protrusion	0~1000‰	0~1000		0		
P0-52	24052	0X2200:53	Compensation value for CW direction of quadrant protrusion	0~1000‰	0~1000		0		
P0-53	24053	0X2200:54	Quadrant bulge compensation delay	0~1000ms	0~1000		0		
P0-54	24054	0X2200:55	Quadrant bulge compensation filtering	0~100ms	0~100		0		
P0-55	24055	0X2200:56	Gravity compensation value	0~1000‰	0~1000		0		
P0-56	24056	0X2200:57	Gravity compensation polarity	0:CCW direction compensation 1:CW direction compensation	0~1		0		
P0-57	24057	0X2200:58	Frequency of notch filter	10-5000 Hz	10~5000		100		
P0-58	24058	0X2200:59	Depth of notch filter	0~20	0~20		10		
P0-59	24059	0X2200:60	Notch filter gain	0~500%	0~500		0		
P0-60	24060	0X2200:61	Zero offset of	0~2048,<<12	0~2048		253		

			magnetic pole						
P0-61	24061	0X2200:62	Speed command (for debugging)	Speed mode instruction Pn parameter instruction given	0~4500	rpm	100		
P0-62~ P0-64	24062~ 24064	0X2200:63~ 0X2200:65	reserve						
P0-65	24065	0X2200:66	Ud-Kp	130	0~800		50		
P0-66	24066	0X2200:67	Ud-Ki	25	0~500		25		
P0-67	24067	0X2200:68	Uq-Kp	130	0~300		50		
P0-68	24068	0X2200:69	Uq-Ki	25	0~300		25		
P0-69	24069	0X2200:70	reserve						
P0-70	24070	0X2200:71	Speed command polarity	0~1	0~1		0		
P0-71	24071	0X2200:72	Servo adaptive rigidity	20~20000 (Prevent nodding phenomenon during the enabling process under gravity or load conditions)	20~ 20000		1200	▲	
P0-72	24072	0X2200:73	The first set of gain speed inflection points	/	0~6000	rpm	6000		
P0-73	24073	0X2200:74	The Second set of gain speed inflection points	/	0~6000	rpm	6000		
P0-74~ P0-79	24074~ 24079	0X2200:75~ 0X2200:80	reserve						
P0-80	24080	0X2200:81	One click aging parameters		0~6		0		
P0-81	24081	0X2200:82	Internal function switch	Units:Busbar voltage correlation adjustment enabled 0:Close 1:Enable Tens:Dead zone compensation enabled 0:Close 1:Enable Hundreds:Peak current suppression 0:Close 1:Enable Thousands:reserve 0:Normal mode	0x0000~ 0x111		0x0000	H	P.S.T
P0-82	24082	0X2200:83	Manufacturer calibration mode	Units:Manufacturer's current calibration mode 0:Close 1:Enable, For internal motor calibration by the manufacturer only Other:reserve	0x0000~ 0x0001		0x0000	H	PST

P0-83	24083	0X2200:84	reserve						
P0-84	24084	0X2200:85	VDC calibration	27800~37683	27800~37683		27800	K	P.S.T
P0-85	24085	0X2200:86	High position of serial number (first test year)	2015~2029	2015~2029		2017	K	P.S.T
P0-86	24086	0X2200:87	Median of serial number (first test month day)	0101~1231	0101~1231		907	K	P.S.T
P0-87	24087	0X2200:88	Low position of serial number (first test serial number)	0x0000~0xFFFF	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-88	24088	0X2200:89	Single board tooling testing QC label	0xA7E3:Pass other:NG	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-89	24089	0X2200:90	Test the QC label before aging	0x8F68:Pass other:NG	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-90	24090	0X2200:91	12-hour aging test label	0x5A5A:Pass other:NG	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-91	24091	0X2200:92	Test label for the entire machine after aging	0xB80F:Pass other:NG	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-92	24092	0X2200:93	Function password	E5DA:Clear encoder multi-turn value	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-93	24093	0X2200:94	reserve						
P0-94	24094	0X2200:95	reserve	reserve					
P0-95	24095	0X2200:96	reserve	reserve	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-96	24096	0X2200:97	reserve	reserve	0x0000~0xFFFF		0x0000	H/R/K	P.S.T
P0-97	24097	0X2200:98	reserve	reserve	0x0000~0xFFFF		0x0000	H/R/K	P.S.T
P0-98	24098	0X2200:99	reserve	reserve	0x0000~0xFFFF		0x0000	H/R/K	P.S.T
P0-99	24099	0X2200:100	reserve	reserve	0x0000~0xFFFF		0x0000	H/K	

7.1.5.2 Advanced Debugging Parameter Group

P1 group	Advanced Debugging Parameter Group								
Function code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Setting Range**	**Unit**	**Factory value**	**Attribute**	**Associated mode**
P1-00	24100	0X2201:01	Self-adjusting mode	0:Manual adjustment 1:Rigidity grade adjustment 2:Position loop bandwidth+inertia self adjustment (slowly changing) 3:Position loop bandwidth+inertia self adjustment (rapid change)	0~3		0		
P1-01	24101	0X2201:02	Rigidity grade	Rigidity grade setting	1~32		12		
P1-02	24102	0X2201:03	reserve	reserve	0~65535		0		
P1-03	24103	0X2201:04	Inertia identification mode	0:Internal command round-trip motion mode 1:Controller instruction mode 2:Continuous automatic identification	0~2		0		
P1-04	24104	0X2201:05	Inertia identification completion mark	0:Inertia identification incomplete 1:Inertia identification completed	0~1		0		
P1-05	24105	0X2201:06	Inertia identification maximum speed	Inertia identification allows for maximum operating speed	100~3000	rpm	1000		
P1-06	24106	0X2201:07	Inertia identification acceleration time	Inertia identification speed accelerates from 0 to 5000 revolutions per minute	10~30000	ms	100		
P1-07	24107	0X2201:08	Maximum number of motion cycles for inertia identification	The allowable number of operating cycles for inertia identification	1~50	r	5		
P1-08	24108	0X2201:09	Waiting time for completion of single inertia identification	Waiting time for completion of single inertia identification motion	0~30000	ms	100		
P1-09~P1-14	24109~24114	0X2201:10~0X2201:15	reserve	reserve	0~65535		0		
P1-15	24115	0X2201:16	Vibration detection threshold	Vibration detection threshold	0~100		100		
P1-16	24116	0X2201:17	Vibration detection time	Vibration detection time	0~100		50		
P1-17	24117	0X2201:18	Frequency of the first notch filter	Frequency of notch filter	0~65535		5000		

P1-18	24118	0X2201:19	Width of the first notch filter	Width of notch filter	0~65535		2		
P1-19	24119	0X2201:20	Depth of the first notch filter	Depth of notch filter	0~65535		0		
P1-20	24120	0X2201:21	Frequency of the second notch filter	Frequency of notch filter	0~65535		5000		
P1-21	24121	0X2201:22	Width of the second notch filter	Width of notch filter	0~65535		2		
P1-22	24122	0X2201:23	Depth of the second notch filter	Depth of notch filter	0~65535		0		
P1-23	24123	0X2201:24	Frequency of the third notch filter	Frequency of notch filter	0~65535		5000		
P1-24	24124	0X2201:25	Width of the third notch filter	Width of notch filter	0~65535		2		
P1-25	24125	0X2201:26	Depth of the third notch filter	Depth of notch filter	0~65535		0		P
P1-26	24126	0X2201:27	Frequency of the fourth notch filter	Frequency of notch filter	0~65535		5000		P
P1-27	24127	0X2201:28	Width of the fourth notch filter	Width of notch filter	0~65535		2		P
P1-28	24128	0X2201:29	Depth of the fourth notch filter	Depth of notch filter	0~65535		0		
P1-29	24129	0X2201:30	Frequency of the fifth notch filter	Frequency of notch filter	0~65535		5000		
P1-30	24130	0X2201:31	Width of the fifth notch filter	Width of notch filter	0~65535		2		S
P1-31	24131	0X2201:32	Depth of the fifth notch filter	Depth of notch filter	0~65535		0		S
P1-32	24132	0X2201:33	End vibration suppression frequency	End positioning vibration suppression frequency	0~65535		2000		S
P1-33	24133	0X2201:34	End vibration suppression frequency compensation	End vibration suppression frequency compensation	0~200		100		S
P1-34	24134	0X2201:35	Maximum allowable weak magnetic current	Maximum allowable weak magnetic current	0~100		50		S
P1-35	24135	0X2201:36	Weak magnetic enablement	0:shut down the weak magnetic function 1:Enable weak magnetic function	0~1		0		S
P1-36	24136	0X2201:37	Weak magnetic gain	Weak magnetic gain	0~300		100%		S
P1-37	24137	0X2201:38	Weak magnetic point velocity	Enable weak magnetic control speed	0~6000		4000		P
P1-38	24138	0X2201:39	PDFF control gain coefficient	PDFF control gain coefficient	0~100		100		
P1-39	24139	0X2201:40	reserve						
P1-40	24140	0X2201:41	reserve						T
P1-41	24141	0X2201:42	reserve						T

P1-42	24142	0X2201:43	Disturbance compensation time coefficient	Disturbance compensation time coefficient	0~40000	0.1 Hz	15.0		T
P1-43	24143	0X2201:44	Disturbance cut-off frequency	Disturbance cut-off frequency	0~40000	0.1 Hz	400.0		T
P1-44	24144	0X2201:45	Disturbance compensation gain	Disturbance compensation gain	0~100	%	0.0		T
P1-45	24145	0X2201:46	Disturbance observer inertia correction coefficient	Disturbance observation inertia correction coefficient	0~3000	%	100		
P1-46	24146	0X2201:47	Model tracking control mode	0:Do not use model tracking control 1:Activate model tracking control + rigid body model 2:Enable model tracking control+dual inertia model	0~300	%	10		
P1-47	24147	0X2201:48	Model tracking control gain	Model tracking control gain	0~30000	0.1 Hz	400		
P1-48	24148	0X2201:49	Model tracking control compensation gain	Model tracking control compensation gain	0~200	%	100		
P1-49	24149	0X2201:50	Double inertia model resonance frequency	Double inertia model resonant frequency	1~100		1		
P1-50	24150	0X2201:51	Double inertia model resonance frequency	Double inertia model anti-resonant frequency	100~6000	rpm	3000		
P1-51	24151	0X2201:52	Double inertia model velocity feedforward value	Double inertia model velocity feedforward value	0~100	%	0		
P1-52	24152	0X2201:53	Doublel inertia model torque feedforward value	Doublel inertia model torque feedforward value	0~100	%	0		
P1-53	24153	0X2201:54	reserve						
P1-54	24154	0X2201:55	reserve						
P1-55	24155	0X2201:56	Torque ripple suppression frequency	Torque ripple suppression frequency	1~50000	0.1 Hz	400		
P1-56	24156	0X2201:57	Torque ripple suppression compensation	Torque ripple suppression compensation	0~100	%	0		
P1-57	24157	0X2201:58	Torque ripple suppression phase	Torque ripple suppression phase	0~2048		0		
P1-58	24158	0X2201:59	Torque command filtering cut-off frequency	Torque command filtering cut-off frequency	1~16000	Hz	4000		
P1-59~P1-99	24159~24199	0X2201:60~0X2201:100	reserve						

7.1.5.3 Motor parameter group

P2 group	Motor parameter group								
Function code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Setting Range**	**Unit**	**Factory value**	**Attribute**	**Associated mode**
P2-00	24200	0X2202:01	Rated power of motor		1~65535	0.001 kw	75	R	
P2-01	24201	0X2202:02	Rated current of motor		1~65535	0.01 A	500	R	S
P2-02	24202	0X2202:03	Maximum current of motor		1~65535	0.01 A	500	R	S
P2-03	24203	0X2202:04	Rated speed of motor		100~6000	rpm	3000	R	P
P2-04	24204	0X2202:05	Maximum speed of motor		100~6000	rpm	6000	R	S
P2-05	24205	0X2202:06	Rated torque of motor		10~65535	0.01 Nm	239	R	S
P2-06	24206	0X2202:07	Maximum torque of motor		10~65535	0.01 Nm	716	R	S
P2-07	24207	0X2202:08	Maximum speed torque value of motor		10~65535	0.01 Nm	716	R	P
P2-08	24208	0X2202:09	Number of motor poles		2~100		5	R	S
P2-09	24209	0X2202:10	Motor back electromotive force coefficient		1~65535	0.01 mV/rpm	3330	R	
P2-10	24210	0X2202:11	Motor torque constant		1~65535	0.01 Nm/Arms	51	R	
P2-11	24211	0X2202:12	Motor rotor inertia		1~65535	0.01 kg.cm2	130	R	
P2-12	24212	0X2202:13	Motor D-axis inductance		1~65535	0.01 mH	387	R	
P2-13	24213	0X2202:14	Motor Q-axis inductance		1~65535	0.01 mH	327	R	
P2-14	24214	0X2202:15	Motor stator resistance		1~65535	0.001Ω	500	R	
P2-15	24215	0X2202:16	Electrical time constant of motor		1~65535	0.01 ms	654	R	
P2-16	24216	0X2202:17	Mechanical time constant of motor		1~65535	0.01 ms	24	R	
P2-17	24217	0X2202:18	Motor zero offset		1~65535		205	R	
P2-18 ~ P2-99	24218~ 24299	0X2202:19~ 0X2202:100							

7.1.5.4 Functional parameter group

P3 group	Functional parameter group								
Function code	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**Setting Range**	**Unit**	**Factory value**	**Attri-bute**	**Associated mode**
P3-00~ P3-17	24300~ 24317	0X2203:01~ 0X2203:18	reserve	reserve	0~65535		0		
P3-18	24318	0X2203:19	DO1 function Settings	Units&Tens:Function Settings 00:No function 01:Axis 1 reserved state 02:Axis 2 reserved state 03:Axis 3 reserved state 04:Axis 1 enable Status 05:Axis 2 enable Status 06:Axis 3 enable Status 07:Axis 1 alarm status 08:Axis 2 alarm status 09:Axis 3 alarm status 0A:ETHERCAT virtual output DO1 0B:ETHERCAT virtual output DO2 0C:ETHERCAT virtual output DO3 0D:ETHERCAT virtual output DO4 0E:ETHERCAT virtual output DO5 0F:ETHERCAT virtual output DO6 10:ETHERCAT virtual output DO7 11:ETHERCAT virtual output DO8 Hundreds&Thousands: 00:Positive logic 01:Negative logic	0x0000~ 0x0111		0x0000		
P3-19	24319	0X2203:20	DO2 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-20	24320	0X2203:21	DO3 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-21	24321	0X2203:22	DO4 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-22	24322	0X2203:23	DO5 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-23	24323	0X2203:24	DO6 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-24	24324	0X2203:25	DO7 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-25	24325	0X2203:26	DO8 function Settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-26~ P3-99	24326~ 24399	0X2203:27~ 0X2203:100	reserve	reserve	0~65535		0		

7.1.5.5 Monitoring parameter group

d0 group	Monitoring parameter group				
Function Codes	**MODBUS mapping address**	**ETHERCAT mapping address**	**Function Codes name**	**Parameter Description**	**unit**
d0-00	34000	0X3200:01	Motor speed		rpm
d0-01	34001	0X3200:02	reserve		
d0-02	34002	0X3200:03	DIDO status monitoring	Low 8 indicates DI1~DI8, while high 8 indicates DO1~DO8	
d0-03	34003	0X3200:04	The encoder position feeds back the low bit		
d0-04	34004	0X3200:05	The encoder position feeds back the high bit		
d0-05	34005	0X3200:06	Position deviation		
d0-06	34006	0X3200:07	q-axis voltage		
d0-07	34007	0X3200:08	Bus synchronization correction cycle	Bus synchronization correction cycle	
d0-08	34008	0X3200:09	d-axis voltage		
d0-09	34009	0X3200:10	Average load rate		
d0-10	34010	0X3200:11	Multi-circle position		
d0-11	34011	0X3200:12	Encoder obtains motor code	Encoder obtains motor code	
d0-12	34012	0X3200:13	Position command high position		
d0-13	34013	0X3200:14	Position command low position		
d0-14	34014	0X3200:15	reserve		
d0-15	34015	0X3200:16	Electric motor angle		
d0-16	34016	0X3200:17	bus voltage		
d0-17	34017	0X3200:18	Historical lowest bus voltage		
d0-18	34018	0X3200:19	The highest bus voltage in history		
d0-19	34019	0X3200:20	Drive temperature		
d0-20	34020	0X3200:21	Encoder fault counting		
d0-21	34021	0X3200:22	Target position high		
d0-22	34022	0X3200:23	Target position low		
d0-23	34023	0X3200:24	reserve		
d0-24	34024	0X3200:25	reserve		
d0-25	34025	0X3200:26	reserve		
d0-26	34026	0X3200:27	reserve		
d0-27	34027	0X3200:28	reserve		
d0-28	34028	0X3200:29	Motor overload rate	Motor overload rate	
d0-29	34029	0X3200:30	reserve		
d0-30	34030	0X3200:31	reserve		
d0-31	34031	0X3200:32	reserve		
d0-32	34032	0X3200:33	reserve		
d0-33	34033	0X3200:34	The original value of U-phase current sampling		
d0-34	34034	0X3200:35	The original value of V-phase		

			current sampling		
d0-35	34035	0X3200:36	reserve		
d0-36	34036	0X3200:37	Motor torque feedback		
d0-37	34037	0X3200:38	reserve		
d0-38	34038	0X3200:39	Motor torque given		
d0-39~ d0-50	34039~34050	0X3200:40~ 0X3200:51	reserve		
d0-51	34051	0X3200:52	EtherCAT maximum communication cycle		
d0-52	34052	0X3200:53	EtherCAT real-time communication cycle		
d0-53~ d0-91	34053~34091	0X3200:54~ 0X3200:92	reserve		
d0-92	34092	0X3200:93	ECAT port error count	ECAT port error count	
d0-93	34093	0X3200:94	PDI port error count	PDI port error count	
d0-94	34094	0X3200:95	reserve		
d0-95	34095	0X3200:96	reserve		
d0-96	34096	0X3200:97	reserve		
d0-97	34097	0X3200:98	Software version-year		
d0-98	34098	0X3200:99	Software version-month day		
d0-99	34099	0X3200:100	Software version-SN		

7.1.5.6 Alarm code and description

ErrCode	Alarm code and description			
Function Codes	**ETHERCAT code**	**Function Codes name**	**Parameter Description**	**Can it be reset**
Er.001	0xFF01	Emergency stop alarm	The DI terminal of the drive has an emergency stop signal input	
Er.002	0xFF02	Overcurrent	Motor code error, encoder cable not corresponding to motor, UVW short-circuit, ground short-circuit, power module drive undervoltage, drive ground short-circuit damage (caused by one phase of UVW not being grounded). Clear the alarm after powering on again	
Er.003	0xFF03	reserve		
Er.004	0xFF04	External busbar disconnection	Not connected to the DC bus	
Er.005	0xFF05	overload	Motor code error, motor brake not opened, motor load locked-rotor, motor phase loss, motor selection too small, excessive load, etc	
Er.006	0xFF06	reserve		
Er.007	0xFF07	Motor initialization in progress	The motor encoder is not connected, the encoder cable is abnormal (wiring error), the encoder protocol is abnormal (the motor encoder protocol corresponding to the motor code does not match the actual connected encoder), the current sampling is abnormal, etc	
Er.008	0xFF08	reserve		
Er.009	0xFF09	Abnormal three-phase current	The motor is not connected, the motor is missing phase, the motor phase sequence is incorrect, the motor code is set incorrectly, the power supply voltage of the drive is low, the load exceeds the allowable value at high motor speed, and the drive gain parameter is abnormal	

Er.010	0xFF0A	reserve		
Er.011	0xFF0B	Bus undervoltage	Low voltage of the power grid, poor input contact of the drive main circuit, etc. Alarm when bus voltage is below 185V	
Er.012	0xFF0C	Bus overvoltage	Failure to connect the braking resistor, high resistance of the braking resistor, and excessive feedback energy from the load. Alarm when bus voltage exceeds 395V	
Er.013	0xFF0D	Position instruction too large	The increment of the master station position command is too large, the unit setting of the master station encoder is incorrect, the synchronization period (Px. 50) is set incorrectly, the drive is not set to absolute value type, resulting in the loss of reference point after power on, and the electronic gear parameter setting is incorrect	
Er.014	0xFF0E	reserve		
Er.015	0xFF0F	Drive overheating	The ambient temperature is too high, the installation environment is not adequately ventilated, and the drive fan is damaged. Drive temperature above 85 ° C alarm	
Er.016	0xFF10	Failed to write EEPROM	Incorrect parameter settings, EEPROM abnormal	
Er.017	0xFF11	Read EEPROM failed	EEPROM abnormal	
Er.018	0xFF12	Excessive positional deviation	The position gain setting is too small, the speed gain parameter setting is unreasonable, the load is too heavy, the position deviation alarm threshold setting is too small, the motor locked-rotor, the motor line sequence is incorrect, the motor torque limit is too small, etc	
Er.019	0xFF13	reserve		
Er.020	0xFF14	Coder error	Encoder communication abnormality, unreliable encoder wiring, encoder interference	
Er.021	0xFF15	Abnormal speed measurement	Abnormal speed measurement, encoder interference, encoder abnormality	
Er.022	0xFF16	Coder initialization in progress	Encoder not connected, unreliable encoder wiring	
Er.023	0xFF17	reserve		
Er.024	0xFF18	External bus error	External module alarm input	
Er.025	0xFF19	reserve		
Er.026	0xFF1A	reserve		
Er.027	0xFF1B	EEPROM parameter verification error	EEPROM abnormal	
Er.028	0xFF1C	reserve		
Er.029	0xFF1D	reserve		
Er.030	0xFF1E	reserve		
Er.031	0xFF1F	Alarm clearing too frequently	Clear alarms multiple times in a short period of time	
Er.032	0xFF20	Parameter initialization error	EERPOM parameters need to be initialized and restored to factory settings	
Er.033	0xFF21	EtherCAT COMMUNICATION ERROR	The master station is not connected, disconnected, the EtherCAT network cable is unreliable, and the EtherCAT network cable is interfered with	
Er.034	0xFF22	battery failure	The battery voltage is below 3.0V, or the encoder battery is not connected; Note: If the battery is not replaced, the alarm will sound again after running for 1 minute after resetting the fault.	
Er.035	0xFF23	reserve		

Er.036	0xFF24	Multiple circles lost	The absolute value encoder is not connected to the battery, or multiple cycles of information are lost due to plugging and unplugging when the battery is present。Alarm for battery voltage below 2.5V. When the alarm is triggered, DS402 statusword bit3=1, controlword set to 0x80 cannot be cleared, controlword bit 12 must be set to 1 to clear. After successful clearing, statusword bit3=0	
Er.037	0xFF25	reserve		
Er.038	0xFF26	Motor code recognition error	The motor code has not been written into the motor, and the motor power does not match the driving power	
Er.039	0xFF27	reserve		
Er.040	0xFF28	Coder Abnormal speed measurement	Abnormal motor encoder, incorrect motor code setting	
Er.041	0xFF29	reserve		
Er.042	0xFF2A	Electric motor racing car	Abnormal motor encoder, incorrect motor proxy settings, incorrect motor phase sequence, excessive external load	
Er.043	0xFF2B	reserve		
Er.044	0xFF2C	INSTANTANEOUS OVERCURRENT	Motor phase sequence error, motor phase loss, motor locked-rotor, incorrect motor code setting, motor output short-circuit to ground	
Er.045	0xFF2D	reserve		
Er.046	0xFF2E	Instantaneous short-circuit	Motor phase sequence error, motor phase loss, motor locked-rotor, incorrect motor code setting, motor output short-circuit to ground	
Er.047	0xFF2F	reserve		
Er.048	0xFF30	The motor power line is not connected	Poor contact or disconnection of motor power line	
Er.049	0xFF31	reserve		
Er.050	0xFF32	Positive limit trigger	The DI terminal of the drive has a positive limit signal input	
Er.051	0xFF33	Negative limit triggered	The DI terminal of the drive has a negative limit signal input	
Er.052	0xFF34	Double STO trigger	Both safe torque offions are triggered	
Er.053	0xFF35	STO1 trigger	The first safety torque turn-off trigger	
Er.054	0xFF36	STO2 trigger	The second safety torque turn-off trigger	
Er.055	0xFF37	STO detection error	Safety torque shutdown hardware detection error	
Er.056	0xFF38	Anti collision signal triggered	Anti collision signal triggered	
Er.057~ Er.100	0xFF31~ 0xFF64	reserve		
Er.227	0xFFE3	Hardware encryption error	Drive hardware that has not undergone hardware decryption or piracy	

8. Product Functions

8.1 STO Safety Function

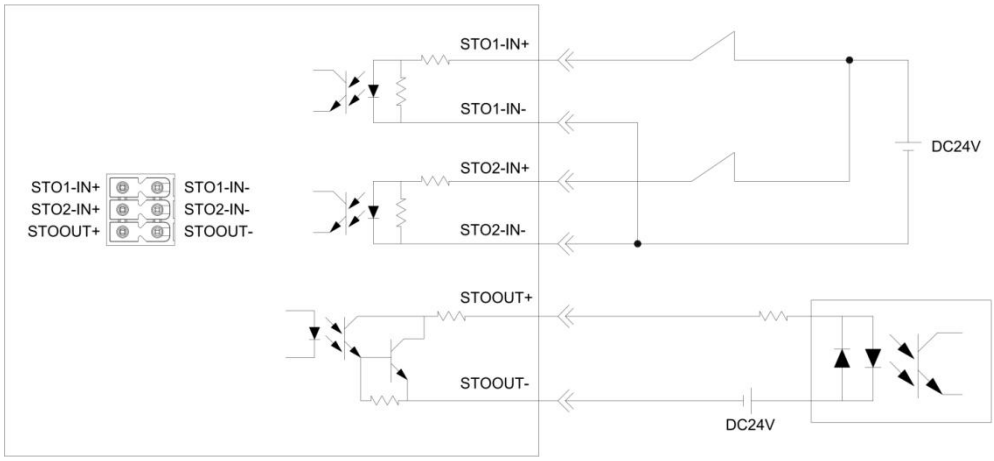
8.1.1 STO Function Definition

STO function is defined as uncontrolled stop in standard EN/IEC 61800-5-2 and corresponds to stop category 0 in IEC 60204-1.

The standard EN/IEC 61800-5-2 defines the safety requirements function for variable speed electric drive systems. According to this standard, when the STO function is enabled, power motors that may cause motion will not be applied. The STO function can be used when power is required to prevent accidental startup.

8.1.2 Implementation of STO Function

The Safety Torque Off (STO) function of the M900 series servo drive is to forcibly turn off the drive signal of the power devices inside the servo drive through the hardware circuit from the safety input signal, thereby turning off the output torque of the motor.



8.1.3 Safety Function Risk Assessment

When using STO safety functions, it is essential to conduct a risk assessment of the equipment to confirm that it meets the safety level specified in the standards.

In order to meet the PL e requirements in EN ISO 13849-1 and SIL3 requirements in IEC 61508, it is necessary to enable the self diagnostic function switch for servo parameter 0x21A0 through a servo drive and monitor the EDM signal through the upper level. When the above steps are not passed, it becomes PL d and SIL2.

Even if the STO function is used, there may still be the following dangers

- Running this function while the servo motor is running, although the power supply to the servo motor has been cut off, the inertia motor will continue to rotate for a period of time Please design a safety system to ensure that there is no danger before the servo motor comes to a complete stop
- When applied to situations such as vertical gravity axis, the motor will move due to the influence of gravity. Please set a mechanical brake in advance to stop the motor In addition, please note that the servo brake circuit of the servo drive, the dynamic brake circuit, and the holding brake of the servo motor are not safety protection measures
- If the power device of the servo drive fails and causes a phase to phase short-circuit in the servo motor, the servo motor can operate within a maximum electrical angle range of 180 degrees and

continue to maintain excitation state Please make sure to use this action without causing any danger

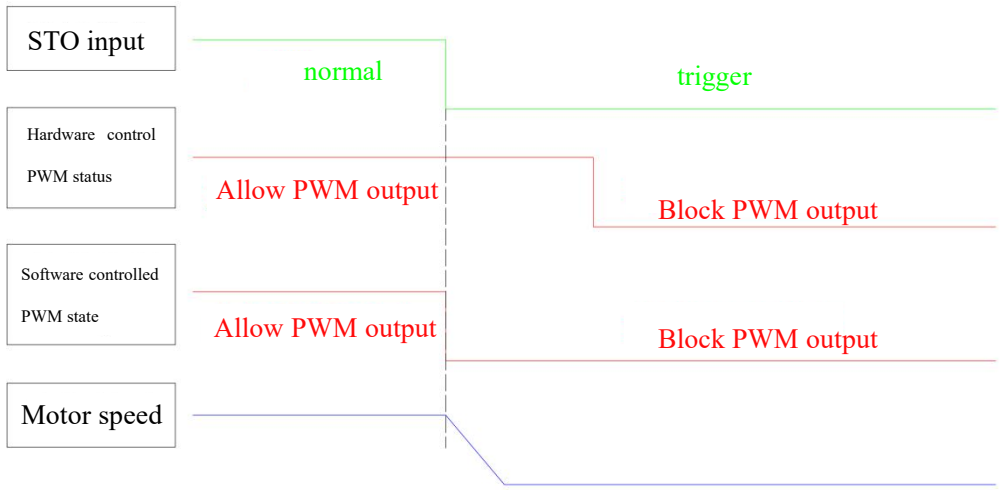
● When installing and replacing the drive mechanically, please make sure to conduct a confirmation test for this function If there are errors in the wiring of input and output signals, it may affect the normal use of this function and lead to danger

● When this function is activated, the input power to the drive is not cut off To prevent electric shock during maintenance and inspection of the drive, please turn off the power before proceeding with the operation

● The EDM output signal is not a safe output. Do not use for purposes other than fault monitoring function.

8.1.4 STO Action Timing

STO Action timing diagram during normal operation of servo drive:



8.1.5 STO Fault Detection and Monitoring（EDM）

The EDM output is used to monitor the signal of wiring faults between the STO circuit or safety device and the STO input. The relationship between STO input signal and fault detection and monitoring output is shown in the following table:

signal name	logical relationship			
STO1 input	ON	ON	OFF	OFF
STO2 input	ON	OFF	ON	OFF
EDMoutput	OFF	ON	ON	ON

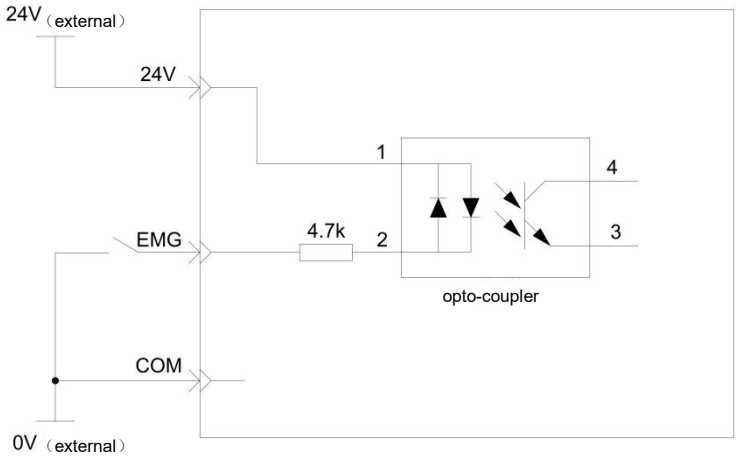
When the 2-channel STO input signal is set to OFF and the safety function is activated, the EDM output signal will be ON within a maximum of 6ms.

8.2 Machine-Wide Single-Point Emergency Stop

The design of the single point emergency stop of the whole machine function is to ensure fast and reliable stopping of all axis movements in emergency situations, protecting the safety of equipment and operators. This function allows customers to simply connect an emergency stop signal to the M900 power module, without the need to separately connect the emergency stop signal lines for each axis. Simplified the unlimited and installation of the system, reduced installation costs, and improved the

maintainability and reliability of the system. When the emergency stop signal is triggered, the drive will immediately stop the movement of all axes and send the corresponding feedback signal to the control system to notify the system of the emergency stop event. This rapid response capability can effectively reduce the occurrence of accidents and maximize the safety of equipment and operators.

The wiring diagram for safety emergency stop is as follows:



9. Communication Functions

9.1 Overview of Communication Protocol

EtherCAT is a high-performance, low-cost, easy-to-use, and topologically flexible industrial Ethernet technology that can be used for ultra high speed I/O networks at the industrial field level. It uses standard Ethernet physical layers and transmission media such as twisted pair cables or fiber optic cables (100 Mbps).

Table 6-1 EtherCatParameter Description

Name	Describe
physical layer	Any cable type of Ethernet is compatible with EtherCAT
communication interface	RJ45×2
Network topology	Linear, tree shaped, star shaped, daisy chain shaped
Transmission speed	2×100 Mbps (Full Duplex)
Maximum data length	1484 bytes
SyncManager	SM0:MailBoxoutput SM1:MailBoxinput SM2: Periodic data output SM3: Periodic data input
FMMU(Bus Memory Management Unit)	FMMU0: Periodic data input area FMMU1: Periodic data output area FMMU2: MailBox Status Area
Application layer protocol	COE:CANOpen Over EtherCAT
Synchronous mode	DC synchronous mode (SYNC 0)
Communication object	SDO: Service Data Object (Non Periodic Data) PDO: Process Data Object (Periodic Data) EMCY: Emergency Event
Application layer specifications	IEC61800-7 CIA402 Drive Profile
Maximum number of stations that can be connected	65535
Supported CIA402 operating modes	Profile Position Mode Profile Velocity Mode Profile Torque Mode Cyclic Synchronous Position Mode Cyclic Synchronous Velocity Mode Cyclic Synchronous Torque Mode Homing Mode

9.2 Wiring

9.2.1 Interface

The servo drive uses RJ45 terminals as the EtherCAT protocol communication port, and the terminal interface is shown in the following figure. Among them, the interface on the upper front of the power module (marked as "IN") is the input interface, and the interface on the right end cover of the drive module (marked as "OUT") is the output interface.

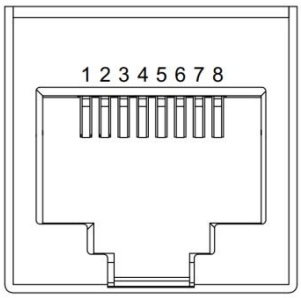


Figure 9-1 Pin Definition

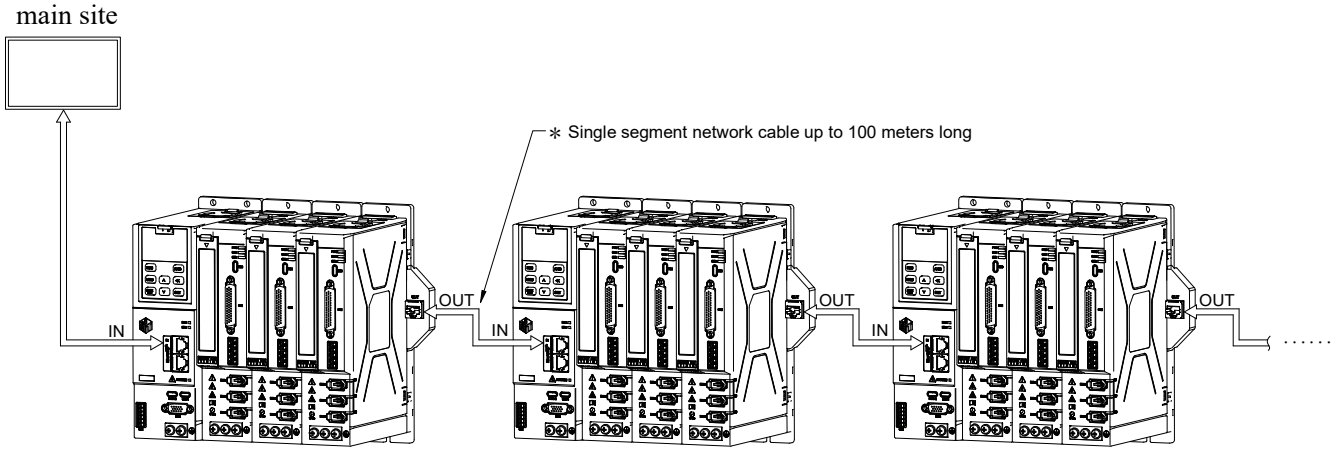
Table 6-2 Definition of communication signal connector pins

Pin number	Name	function
1	TX+	Receiver signal
2	TX-	Receiver signal
3	RX+	send signal
4	--	--
5	--	--
6	RX-	send signal
7	--	--
8	--	--
/	Casing	Shield

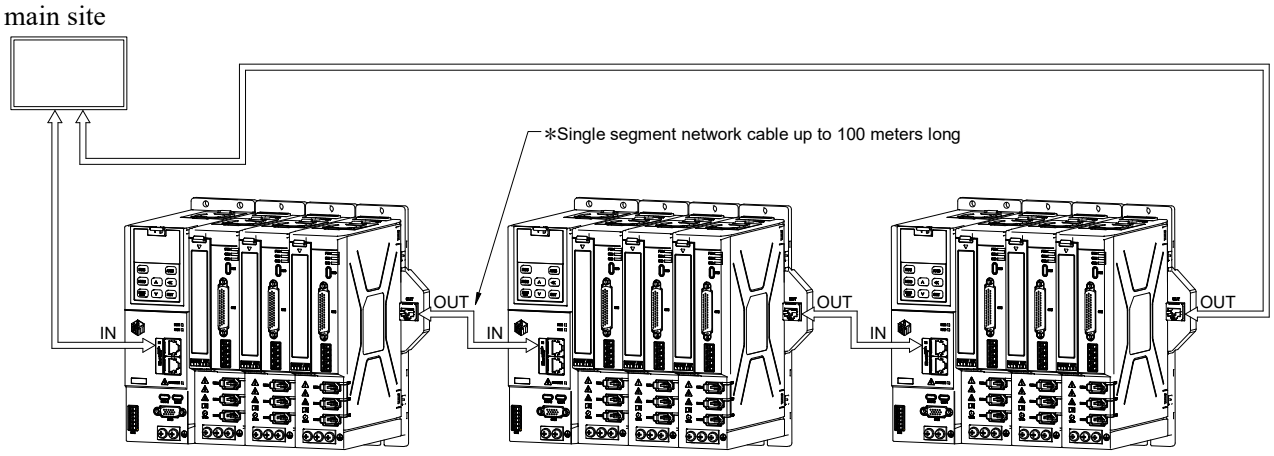
9.2.2 Topology Connection

The M900 series servo drive has flexible topology communication connections and almost no restrictions. The connection topology is shown below.

Linear connection:



Circular redundant connection:



9.2.3 Communication Cable

EtherCAT Communication cable uses Ethernet Category 5 (100BASE-TX) network cables or high-strength shielded network cables. When using M900 series servo drives, shielded network cables are also required to enhance anti-interference capabilities.

9.2.4 EMC Standard

M900 series servo drives comply with IEC/EN61800-3:2004(Adjustable speed electrical power drive systems-part3:EMC requirements and specific test methods)Standard and GB/t12668.3 national standard.

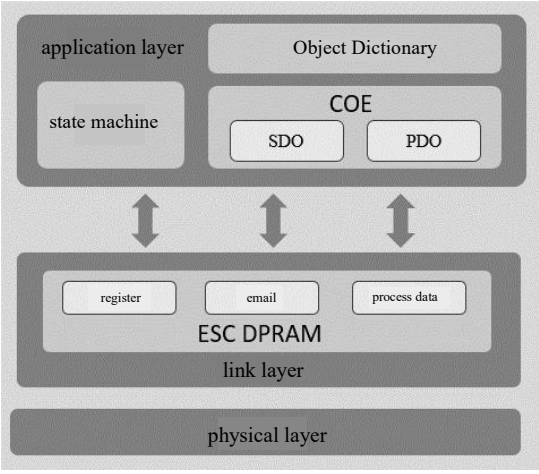
9.3 EtherCAT Communication Fundamentals

9.3.1 EtherCAT Communication Specification

Project		Specifications
Communication protocol		IEC 61158 Type 12, IEC 61800-7 CiA 402 Drive Profile
Application layer	SDO	SDO request, SDO response
	PDO	Variable PDO Mapping
	CiA402	Profile Position Mode Profile Velocity Mode Profile Torque Mode Cyclic Synchronous Position Mode Cyclic Synchronous Velocity Mode Cyclic Synchronous Torque Mode Homing Mode
physical layer	Transport Protocol	100BASE-TX（IEEE802.3）
	Maximum distance	100M
	Interface	RJ45*2（IN、OUT）

9.3.2 Communication Structure

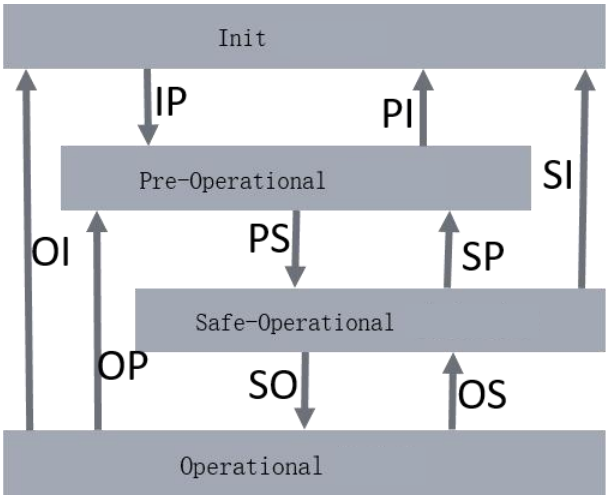
There are multiple Application layer protocols available for EtherCAT communication, but the M900 series servo drives described in this manual use the IEC 61800-7 (CiA402) - CANopen motion control sub protocol. The following figure shows the EtherCAT Communication structure based on the CANopen Application layer.



In the structure diagram, the Application layer object dictionary contains communication parameters, Service Data Objects (SDO), and Process Data Objects (PDO), among others. The PDO process data object contains real-time data during servo operation, which is read and written periodically. SDO email communication configures and accesses certain communication parameter objects non periodically.

9.3.3 EtherCAT State Machine

The following is the EtherCAT state transition diagram:



The M900 series servo drive supports four state switches and is responsible for coordinating the state transitions between the master and slave stations from initialization to operation. The following table shows the operations performed internally by the servo from the initialization state to the running state.

State	Describe
Init	The drive successfully completed initialization after power on without any errors occurring. Packet transmission is still not possible in this state.
Pre-Operational	Data can be exchanged through SDO. If there is an abnormal alarm in the servo drive, an emergency message will be transmitted to notify the host computer.
Safe-Operational	SDO and TxPDO data packets can be used to exchange data with the host computer.
Operational	This state can perform all data exchanges including SDO and PDO (TxPDO and RxPDO).

State or State Conversion	Internal related operations
Initialization (I)	There is no communication on the application side, and the master station can only read and write ESC registers
Transition from initialization to pre run Init to Pre-Op(IP)	Master Station Configuration Slave Station Register Configure email channel parameters Configure distributed clock (DC) related registers The master station writes the State control register to request pre run State Application layer email data communication
Pre run (P)	Application layer email data communication
Transition from pre operation to safe operation Pre-Op to Safe-Op(PS)	The master station uses email initialization process to map data SM channel used for data communication during the master station configuration process Master station configuration FMMU The master station writes the State control register to request safe operation of the State
Safe operation (S)	Application layer supports email data communication

	There is process data communication, but only allows reading input data and does not generate output signals
Transition from safe operation to operation Safe-Op to Op(SO)	The master station sends valid output data The master station writes the State control register to request the execution of the State
Run State (O)	Both input and output are valid Email communication can still be used

9.3.4 Process Data

Real time process data (PDO) follows the producer consumer model. PDO can be divided into RPDO (receive PDO) and TPDO (send PDO). The slave station receives instructions from the master station through RPDO and sends its own state information to the master station through TPDO.

9.3.4.1 PDO Mapping parameters

PDO mapping is used to establish the mapping relationship between object dictionary and PDO. In the M900 series drives, 1600h~1603h is RPDO, and 1A00h~1A03h is TPDO. The following table contains information about PDO mapping and mapping objects for this product, and the mapping objects can be changed.

PDO	Index	Maximum number of mappings	Longest mapped byte	Default mapping object
RPDO	1600h	8	32	0x6040h (Control word) 0x607Ah (Target location) 0x60FFh (Target speed) 0x6060h (Control mode) 0x0000h (Supplementary position)
	1601h	8	32	0x6040h (Control word) 0x 607Ah (Target location) 0x 60FFh (Target speed) 0x 6071h (Target torque) 0x 6072h (Maximum torque)
	1602h	8	32	0x6040h (Control word) 0x60FFh (Target speed)
	1603h	8	32	0x6040h (Control word) 0x607Ah (Target location) 0x60FFh (Target speed) 0x6071h (Target torque) 0x6072h (Maximum torque)
RPDO	1610h	8	32	0x6840h (Control word) 0x687Ah (Target location) 0x68FFh (Target speed) 0x6860h(Control mode) 0x0000h (Supplementary position)
	1611h	8	32	0x6840h (Control word) 0x 687Ah (Target location) 0x 68FFh (Target speed)

				0x 6871h (Target torque) 0x 6872h (Maximum torque)
	1612h	8	32	0x6840h (Control word) 0x68FFh (Target speed)
	1613h	8	32	0x6840h (Control word) 0x687Ah (Target location) 0x68FFh (Target speed) 0x6871h (Target torque) 0x6872h (Maximum torque)
RPDO	1620h	8	32	0x7040h (Control word) 0x707Ah (Target location) 0x70FFh (Target speed) 0x7060h(Control mode) 0x0000h (Supplementary position)
	1621h	8	32	0x7040h (Control word) 0x707Ah (Target location) 0x70FFh (Target speed) 0x7071h (Target torque) 0x7072h (Maximum torque)
	1622h	8	32	0x7040h (Control word) 0x70FFh (Target speed)
	1623h	8	32	0x7040h (Control word) 0x707Ah (Target location) 0x70FFh (Target speed) 0x7071h (Target torque) 0x7072h (Maximum torque)
TPDO	1A00h	8	32	0x6041h (State character) 0x6064h (Actual location) 0x606Ch (Actual torque) 0x6061h (Mode display) 0x0000h (Supplementary position)
	1A01h	8	32	0x6041h (State character) 0x603Fh (Error code) 0x6064h (Actual location) 0x60F4h (Follow error) 0x606Ch (Actual torque) 0x6077h (Actual torque)
	1A02h	8	32	0x6041h (State character) 0x60F4h (Follow error)
	1A03h	8	32	0x6041h (State character) 0x603Fh (Error code) 0x6064h (Actual location) 0x60F4h (Follow error) 0x606Ch (Actual torque) 0x6077h (Actual torque)
TPDO	1A10h	8	32	0x6841h (State character) 0x6864h (Actual location)

				0x686Ch (Actual torque) 0x6861h (Mode display) 0x6800h (Supplementary position)
	1A11h	8	32	0x6841h (State character) 0x683Fh (Error code) 0x6864h (Actual location) 0x68F4h (Follow error) 0x686Ch (Actual torque) 0x6877h (Actual torque)
	1A12h	8	32	0x6841h (State character) 0x68F4h (Follow error)
	1A13h	8	32	0x6841h (State character) 0x683Fh (Error code) 0x6864h (Actual location) 0x68F4h (Follow error) 0x686Ch (Actual torque) 0x6877h (Actual torque)
TPDO	1A20h	8	32	0x7041h (State character) 0x7064h (Actual location) 0x706Ch (Actual torque) 0x7061h (Mode display) 0x7000h (Supplementary position)
	1A21h	8	32	0x7041h (State character) 0x703Fh (Error code) 0x7064h (Actual location) 0x70F4h (Follow error) 0x706Ch (Actual torque) 0x7077h (Actual torque)
	1A22h	8	32	0x7041h (State character) 0x70F4h (Follow error)
	1A23h	8	32	0x7041h (State character) 0x703Fh (Error code) 0x7064h (Actual location) 0x70F4h (Follow error) 0x706Ch (Actual torque) 0x7077h (Actual torque)

9.3.4.2 PDO synchronous management allocation settings

In periodic data communication, process data can contain multiple PDO mapping objects. The CoE protocol uses data objects 0x1C10-0x1C2F to define the corresponding PDO mapping object column Table for the synchronization management channel. Multiple PDOs can be mapped to different sub indices in 0x1C10-0x1C2F. In the M900 series servo drive, it supports the allocation of 3 RPDO and 3 TPDO, as shown in the following table:

Index	Sub Index	Mapping allocation	Default mapping allocation
0x1C12	01h	Select three of 1600h~1603h as RPDO applications	1601h
	02h		1611h
	03h		1621h
0x1C13	01h	Select three of 1A00h~1A03h as TPDO applications	1A01h
	02h		1A11h
	03h		1A21h

9.3.4.3 PDO Configuration

PDO Mapping parameters (such as 1601h) contain pointers to the process data that PDO needs to send or receive, including the Index, Sub Index, and length of the mapped object. Among them, Mapping parameters Sub Index0 records the specific number N of mapping objects for the PDO (such as the maximum value of M900 series servo N being 8), which can simultaneously map one or more objects. Sub Index 1-8 is the mapping content (mapping object). The content definition of Mapping parameters is as follows.

digit	31	……	16	15	……	8	7	……	0
meaning	Index			Sub Index			Object length		

Index and Sub Index jointly determine the position of an object in the object dictionary, and the object length indicates the specific bit length of the object, that is:

Object length	bit length
08h	8 digits
10h	16 digits
20h	32 digits

For example, the Mapping parameters for object 6040h-00 are 60400010h.

The configuration process of PDO is as follows:
Attention: Our M900 series drives only allow configuration for 0x1603, 0x1613, 0x1623, 0x1A03, 0x1A13, and 0x1A23. Other addresses cannot be mapped to parameters
1. Cancel PDO. Write the 00hSub Index of 1C12h (or 1C13h) to 0;
2. Clear the original mapping content. Write 0 to the 00hSub Index (such as 1603h-00) of Mapping parameters to clear the original mapping content;
3. Write PDO mapping content. Write Mapping parameters Sub Index 1~N (with a maximum of 10 N) according to the above definition;

4. Write the total number of PDO mapping objects. Write the number of mappings N in step 3 to Mapping parameters Sub Index0 (e.g. 1603h-00 to N);
5. Enable PDO. Write the 00hSub Index of 1C12h (or 1C13h) to 1 or 2.

9.3.5 SDO Mailbox Data

SDO Mailbox Data is used to transmit non periodic data, such as Configuration of communication parameters, Configuration of servo drive operating parameters, etc. In the M900 series servo drive, SDO requests and SDO responses are currently supported.

9.3.6 Distributed Clocks

Distributed Clocks enables different servo devices to use the same system clock, ensuring that different servos receive instructions at the same time and execute them simultaneously, achieving absolute time synchronization. The slave device can generate synchronization signals based on the synchronization system time. The M900 series servo drive supports DC synchronization mode, SM synchronization mode, and Synchronization cycle controlled by SYNC 0, with a cycle of an integer multiple of 125 us.

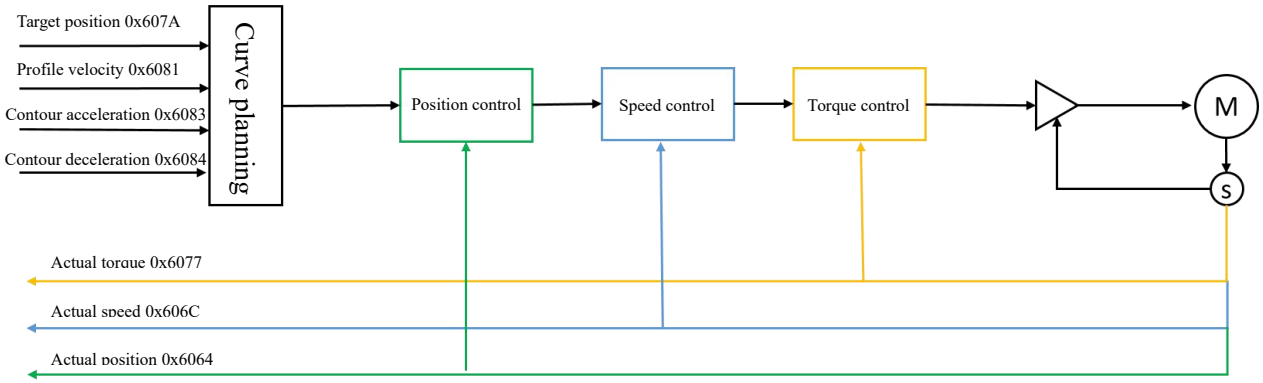
9.4 Control Modes

Note: The following object dictionary 0x60xx is the data for axis 1 of this module, 0x68xx is the data for axis 2 of this module, and 0x70xx is the data for axis 3 of this module, which will not be repeated.
Operating object dictionary 0x6060/0x6860/0x7060 Select servo operation mode:

Set value	Describe
0	NA
1	Profile Position Mode (PP)
2	NA
3	Profile Velocity Mode(pv)
4	Profile Torque Mode(pt)
5	NA
6	Homing Mode(hm)
7	NA
8	Cyclic Synchronous Position Mode(csp)
9	Cyclic Synchronous Velocity Mode (CSV)
10	Cyclic Synchronous Torque Mode(cst)

9.4.1 Profile Position Mode (PP)

When in Profile Position Mode, the master station sends the target position (absolute or relative), velocity, acceleration, and deceleration of the position curve, and other related object dictionaries to the servo drive. The servo drive generates target curve instructions based on the received relevant data and commands.



Related Object Dictionary

Control word 6040h		
Position	**Name**	**Describe**
0	Servo ready(Switch On)	0:Invalid；1:Effective
1	Connect the main circuit power(Enable Voltage)	0:Invalid；1:Effective
2	Fast stop(Quick Stop)	0:Effective；1:Invalid
3	Servo operation(Enable Operation)	0:Invalid；1:Effective
4	New target position setting(New Set-Point)	Rising edge triggers new target position setting

5	Immediate Updating(Change Set Immediately)	0: Not immediately updated; 1: Update immediately
6	Absolute Position Set Instruction/Relative Position Set Instruction (Abs/Rel)	0: Set the target position to absolute position instruction 1: Set the target position to relative position instruction

State word6041h		
Position	**Name**	**Describe**
10	Target achieved(Target Reached)	0: Target Position not reached 1: Target Position has been reached
12	Target Position Update(Set Point Acknowledge)	0: New target position setting can be updated 1: Cannot change the New target position setting
13	Follow the error(Following error)	0: No Position deviation too large fault 1: There is a malfunction where the position deviation is too large
15	homing completed(Home Find)	0: homing not completed 1:homing completed

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x603F	00	Error code	RO	UINT16	-	0~65535
0x6040	00	Control word	RW	UINT16	-	0~65535
0x6041	00	State word	RO	UINT16	-	0~65535
0x6060	00	MODE	RW	INT8	-	0~10
0x6061	00	Mode display	RO	INT8	-	0~10
0x6062	00	Position instruction	RO	INT32	Instruction unit/s	-
0x6063	00	Position feedback	RO	INT32	Coder unit	-
0x6064	00	Position feedback	RO	INT32	Instruction unit/s	-
0x6065	00	Threshold for excessive positional deviation	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x6067	00	Position has reached the threshold	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x6068	00	Position reaches the window	RW	UINT16	ms	0~65535
0x606C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x6072	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x6077	00	Actual torque	RO	UINT16	0.1%	-
0x607A	00	Target Position Setting	RW	INT32	Instruction unit/s	-2^{31} ~(2^{31}-1)
0x6081	00	Profile velocity	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x6083	00	Acceleration	RW	UINT32	ms	0~60000
0x6084	00	Deceleration	RW	UINT32	ms	0~60000
0x6091	01	Motor resolution	RW	UINT32	-	0~(2^{32}-1)
	02	Axis resolution	RW	UINT32	-	1~(2^{32}-1)

0x60E0	00	Positive torque limit	RW	UINT16	0.1%	0~65535
0x60E1	00	Negative torque limit	RW	UINT16	0.1%	0~65535
0x60F4	00	Position deviation	RO	INT32	Coder unit	-

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x683F	00	Error code	RO	UINT16	-	0~65535
0x6840	00	Control word	RW	UINT16	-	0~65535
0x6841	00	State word	RO	UINT16	-	0~65535
0x6860	00	MODE	RW	INT8	-	0~10
0x6861	00	Mode display	RO	INT8	-	0~10
0x6862	00	Position instruction	RO	INT32	Instruction unit/s	-
0x6863	00	Position feedback	RO	INT32	Coder unit	-
0x6864	00	Position feedback	RO	INT32	Instruction unit/s	-
0x6865	00	Threshold for excessive positional deviation	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x6867	00	Position has reached the threshold	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x6868	00	Position reaches the window	RW	UINT16	ms	0~65535
0x686C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x6872	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x6877	00	Actual torque	RO	UINT16	0.1%	-
0x687A	00	Target Position Setting	RW	INT32	Instruction unit/s	-2^{31} ~(2^{31}-1)
0x6881	00	Profile velocity	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x6883	00	Acceleration	RW	UINT32	ms	0~60000
0x6884	00	Deceleration	RW	UINT32	ms	0~60000
0x6891	01	Motor resolution	RW	UINT32	-	0~(2^{32}-1)
	02	Axis resolution	RW	UINT32	-	1~(2^{32}-1)
0x68E0	00	Positive torque limit	RW	UINT16	0.1%	0~65535
0x68E1	00	Negative torque limit	RW	UINT16	0.1%	0~65535
0x68F4	00	Position deviation	RO	INT32	Coder unit	-

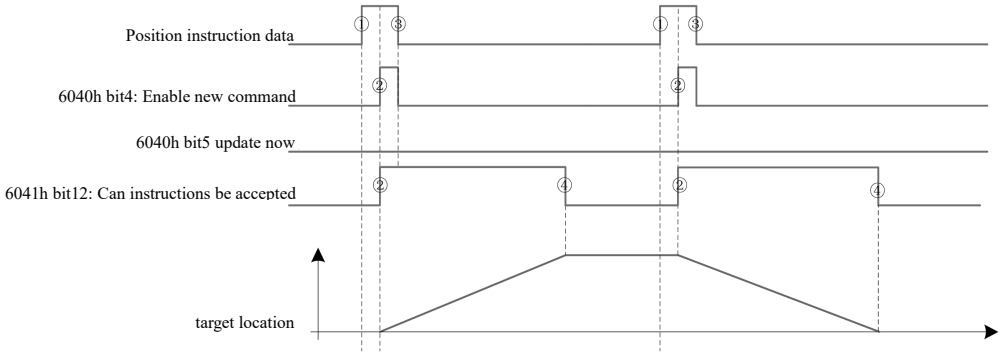
Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x703F	00	Error code	RO	UINT16	-	0~65535
0x7040	00	Control word	RW	UINT16	-	0~65535
0x7041	00	State word	RO	UINT16	-	0~65535
0x7060	00	MODE	RW	INT8	-	0~10
0x7061	00	Mode display	RO	INT8	-	0~10
0x7062	00	Position instruction	RO	INT32	Instruction unit/s	-
0x7063	00	Position feedback	RO	INT32	Coder unit	-
0x7064	00	Position feedback	RO	INT32	Instruction	-

					unit/s	
0x7065	00	Threshold for excessive positional deviation	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x7067	00	Position has reached the threshold	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x7068	00	Position reaches the window	RW	UINT16	ms	0~65535
0x706C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x7072	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x7077	00	Actual torque	RO	UINT16	0.1%	-
0x707A	00	Target Position Setting	RW	INT32	Instruction unit/s	-2^{31} ~(2^{31}-1)
0x7081	00	Profile velocity	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x7083	00	Acceleration	RW	UINT32	ms	0~60000
0x7084	00	Deceleration	RW	UINT32	ms	0~60000
0x7091	01	Motor resolution	RW	UINT32	-	0~(2^{32}-1)
	02	Axis resolution	RW	UINT32	-	1~(2^{32}-1)
0x70E0	00	Positive torque limit	RW	UINT16	0.1%	0~65535
0x70E1	00	Negative torque limit	RW	UINT16	0.1%	0~65535
0x70F4	00	Position deviation	RO	INT32	Coder unit	-

Note: What is the required ms to accelerate from 0 rpm to 3000 rpm or decelerate from 3000 rpm to 0 rpm in 6083h 6084h 688h 708h 708h with Deceleration;

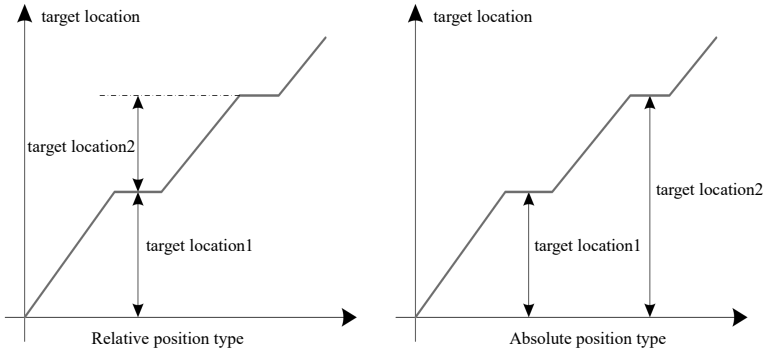
Curve Planning - Non Immediate Updating

(1) The master station sends the relevant information of Position instruction to the slave station as needed (acceleration time 6083h, deceleration time 6084h, Profile velocity 6081h, Target Position Setting 607A);
(2) The master station sets bit 4 of 6040h to 1, and the slave station processes the new Position Shift Instruction received after detecting the rising edge signal of bit 4 of 6040h.
(a) Firstly, check if bit5 of 6040h is 0 from the station. If it is not 0, do not process the relevant Instruction information;
(b) Secondly, if the slave station determines that bit5 of 6040h is 0 and bit12 of 6041h is 0, then the slave station sets bit12 of 6041h to 1 and executes the relevant Instruction information of ①. At this point, the slave station is unable to continue receiving new Position Transfer Instruction States.
(3) After detecting that bit12 of State word 6041h is set to 1, the master station can release the relevant data of Position Shift Instruction and set bit4 of Control word 6040h from 1 to 0.
(4) The slave station detects that bit 4 of Control word 6040h is 0. After completing the current segment positioning, set bit 12 of 6041h to 0. The table shows that the slave station can receive a new Position Shift Instruction.
(a) In non Immediate Updating mode, while the current segment is running, the servo does not process new Position Movement Instructions. Only after the current segment has completed positioning, the servo can receive and process new Position Movement Instructions.



Non Immediate Updating type timing diagram

When the bit 6 of Control Word 6040h is 0, it is set to absolute position, and when the bit 6 of Control Word 6040h is 1, it is set to relative position.



Position type

Curve Planning - Immediate Updating

(1) The master station sends the relevant information of Position instruction to the slave station as needed (acceleration time 6083h, deceleration time 6084h, contour speed 6081h, target Position shift 607A);

(2) The master station sets bit 4 of 6040h to 1, and the slave station processes the new Position Shift Instruction received after detecting the rising edge signal of bit 4 of 6040h.

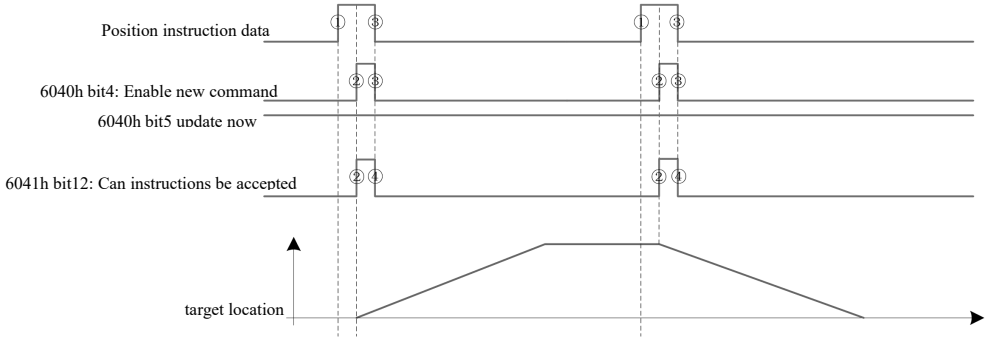
(a) Firstly, check if bit5 of 6040h is 1 from the station. If it is not 1, do not process the relevant Instruction information;

(b) Secondly, if the slave station determines that bit5 of 6040h is 1 and bit12 of 6041h is 0, then the slave station sets bit12 of 6041h to 1 and executes the relevant Instruction information of ①. At this point, the slave station is unable to continue receiving new Position Transfer Instruction States.

(3) After detecting that bit12 of State word 6041h is set to 1, the master station can release the relevant data of Position Shift Instruction and set bit4 of Control word 6040h from 1 to 0.

(4) When the station detects that bit 4 of 6040h is set from 1 to 0, then bit 12 of 6041h is set to 0. The table indicates that the slave station can receive new Position Movement Instructions.

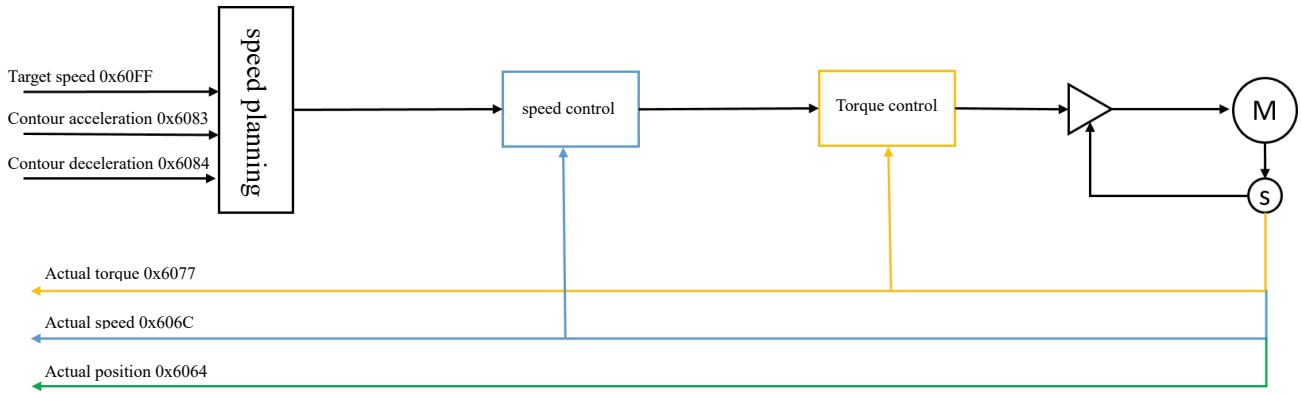
(a) In Immediate Updating mode, while the current segment is running, the slave station detects the rising edge of bit 4 at 6040h, while bit 12 at 604h is 0. The servo can receive and process new Position Shift Instructions.



Immediate Updating type timing diagram

9.4.2 Profile Velocity Mode (PV)

When in Profile Velocity Mode, the master station sends the required target speed, Acceleration time, and Deceleration time to the servo drive, which performs speed and torque adjustments.



Related Object Dictionary

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x603F	00	Error code	RO	UINT16	-	-
0x6040	00	Control word	RW	UINT16	-	0~65535
0x6041	00	State word	RO	UINT16	-	0~65535
0x6060	00	MODE	RW	INT8	-	0~10
0x6061	00	Mode display	RO	INT8	-	0~10
0x6063	00	Position feedback	RO	INT32	Coder unit	-
0x6064	00	Position feedback	RO	INT32	Instruction unit/s	-
0x606C	00	Actual speed feedback	RO	INT32	Instruction unit/s	-
0x6072	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x6077	00	Actual torque	RO	UINT16	0.1%	-
0x60E0	00	Positive torque limit	RW	UINT16	0.1%	0~30000
0x60E1	00	Negative torque limit	RW	UINT16	0.1%	0~3000
0x60FF	00	Target speed	RW	INT32	0.1 rpm	±60000
0x607F	00	Maximum Contour Speed	RW	UINT32	0.1 rpm	0~60000
0x6083	00	Acceleration	RW	UINT32	ms	0~60000
0x6084	00	Deceleration	RW	UINT32	ms	0~60000

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x683F	00	Error code	RO	UINT16	-	-
0x6840	00	Control word	RW	UINT16	-	0~65535
0x6841	00	State word	RO	UINT16	-	0~65535
0x6860	00	MODE	RW	INT8	-	0~10
0x6861	00	Mode display	RO	INT8	-	0~10
0x6863	00	Position feedback	RO	INT32	Coder unit	-
0x6864	00	Position feedback	RO	INT32	Instruction unit/s	-
0x686C	00	Actual speed feedback	RO	INT32	Instruction unit/s	-
0x6872	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x6877	00	Actual torque	RO	UINT16	0.1%	-
0x68E0	00	Positive torque limit	RW	UINT16	0.1%	0~3000
0x68E1	00	Negative torque limit	RW	UINT16	0.1%	0~3000
0x68FF	00	Target speed	RW	INT32	0.1 rpm	±60000
0x687F	00	Maximum Contour Speed	RW	UINT32	0.1 rpm	0~60000
0x6883	00	Acceleration	RW	UINT32	ms	0~60000
0x6884	00	Deceleration	RW	UINT32	ms	0~60000

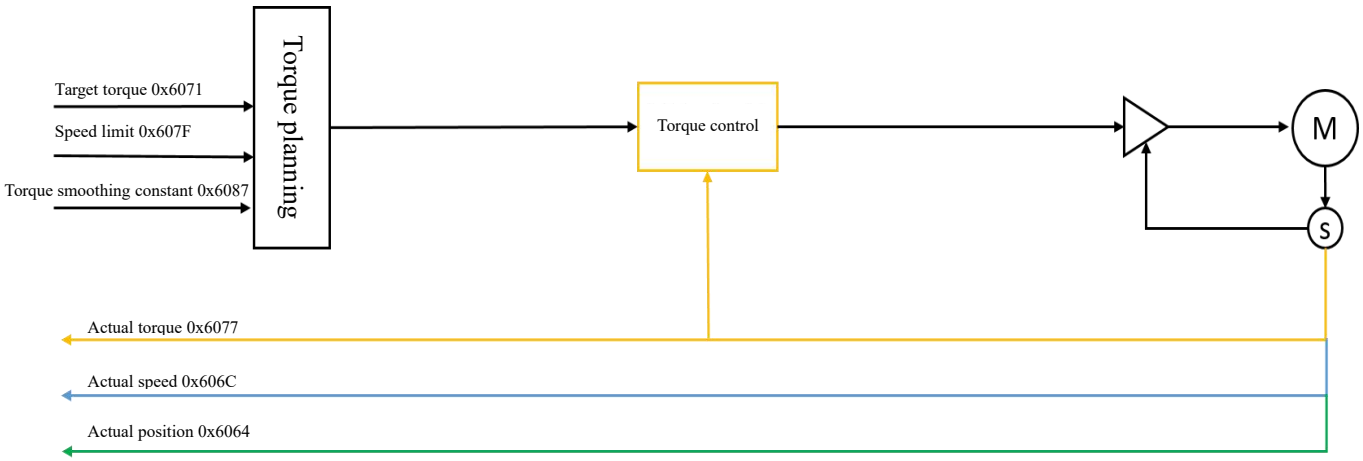
Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x703F	00	Error code	RO	UINT16	-	-
0x7040	00	Control word	RW	UINT16	-	0~65535
0x7041	00	State word	RO	UINT16	-	0~65535
0x7060	00	MODE	RW	INT8	-	0~10
0x7061	00	Mode display	RO	INT8	-	0~10
0x7063	00	Position feedback	RO	INT32	Coder unit	-
0x7064	00	Position feedback	RO	INT32	Instruction unit/s	-
0x706C	00	Actual speed feedback	RO	INT32	Instruction unit/s	-
0x7072	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x7077	00	Actual torque	RO	UINT16	0.1%	-
0x70E0	00	Positive torque limit	RW	UINT16	0.1%	0~3000
0x70E1	00	Negative torque limit	RW	UINT16	0.1%	0~3000
0x70FF	00	Target speed	RW	INT32	0.1 rpm	±60000
0x707F	00	Maximum Contour Speed	RW	UINT32	0.1 rpm	0~60000
0x7083	00	Acceleration	RW	UINT32	ms	0~60000
0x7084	00	Deceleration	RW	UINT32	ms	0~60000

Note:

1. The speed limit value is determined by the smaller of 0x607F, 0x687F, 0x707F, and the maximum motor speed;
2. 2.6083 h 6084h 6883h 6884h 7083h 7084h What is the required ms for Deceleration to accelerate from 0 rpm to 3000 rpm or decelerate from 3000 rpm to 0 rpm;

9.4.3 Profile Torque Mode (PT)

In Profile Torque Mode, the master station sends the target torque Instruction 6071h, torque ramp constant 6087h, and speed limit amplitude 607Fh to the servo drive, and the torque regulator is executed internally by the servo drive. When the speed reaches the limit amplitude of 607Fh, it will enter the speed regulation stage.



Related Object Dictionary

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x603F	00	Error code	RO	UINT16	-	0~65535
0x6040	00	Control word	RW	UINT16	-	0~65535
0x6041	00	State word	RO	UINT16	-	0~65535
0x6060	00	MODE	RW	INT8	-	0~10
0x6061	00	Mode display	RO	INT8	-	0~10
0x606C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x6071	00	Target torque	RW	INT16	0.1%	-3000~3000
0x6072	00	Maximum torque	RW	INT16	0.1%	-3000~3000
0x6074	00	Torque Instruction	RO	INT16	0.1%	-
0x6077	00	Actual torque	RO	UINT16	0.1%	-
0x607F	00	Maximum Contour Speed	RW	UINT32	0.1 rpm	0-60000
0x6087	00	Torque ramp time	RW	UINT32	ms	0-60000
0x60E0	00	Positive torque limit	RW	UINT16	0.1%	0~3000
0x60E1	00	Negative torque limit	RW	UINT16	0.1%	0~3000

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x683F	00	Error code	RO	UINT16	-	0~65535
0x6840	00	Control word	RW	UINT16	-	0~65535
0x6841	00	State word	RO	UINT16	-	0~65535

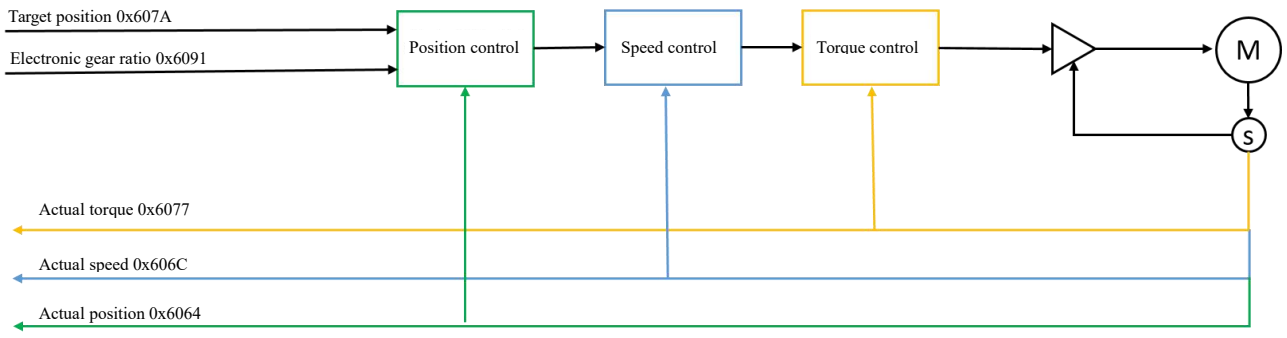
0x6860	00	MODE	RW	INT8	-	0~10
0x6861	00	Mode display	RO	INT8	-	0~10
0x686C	00	Actual speed feedback	RO	INT32	Instruction unit/s	-
0x6871	00	Target torque	RW	INT16	0.1%	-3000~3000
0x6872	00	Maximum torque	RW	INT16	0.1%	-3000~3000
0x6874	00	Torque Instruction	RO	INT16	0.1%	-
0x6877	00	Actual torque	RO	UINT16	0.1%	-
0x687F	00	Maximum Contour Speed	RW	UINT32	0.1 rpm	0-60000
0x6887	00	Torque ramp time	RW	UINT32	ms	0-60000
0x68E0	00	Positive torque limit	RW	UINT16	0.1%	0~3000
0x68E1	00	Negative torque limit	RW	UINT16	0.1%	0~3000

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x703F	00	Error code	RO	UINT16	-	0~65535
0x7040	00	Control word	RW	UINT16	-	0~65535
0x7041	00	State word	RO	UINT16	-	0~65535
0x7060	00	MODE	RW	INT8	-	0~10
0x7061	00	Mode display	RO	INT8	-	0~10
0x706C	00	Actual speed feedback	RO	INT32	Instruction unit/s	-
0x7071	00	Target torque	RW	INT16	0.1%	-3000~3000
0x7072	00	Maximum torque	RW	INT16	0.1%	-3000~3000
0x7074	00	Torque Instruction	RO	INT16	0.1%	-
0x7077	00	Actual torque	RO	UINT16	0.1%	-
0x707F	00	Maximum Contour Speed	RW	UINT32	0.1 rpm	0-60000
0x7087	00	Torque ramp time	RW	UINT32	ms	0-60000
0x70E0	00	Positive torque limit	RW	UINT16	0.1%	0~3000
0x70E1	00	Negative torque limit	RW	UINT16	0.1%	0~3000

Note: The time required to reach the rated torque in milliseconds is 6087h, 6887h, and 7087h.

9.4.4 Cyclic Synchronous Position Mode (CSP)

In Cyclic Synchronous Position Mode, the master station sends the planned Target Position Setting 607Ah to the servo drive in a periodic synchronization manner based on the value of Target speed60FFh. The servo drive performs position, speed, and torque control internally.



Related Object Dictionary

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x603F	00	Error code	RO	UINT16	-	0~65535
0x6040	00	Control word	RW	UINT16	-	0~65535
0x6041	00	State word	RO	UINT16	-	0~65535
0x6060	00	MODE	RW	INT8	-	0~10
0x6061	00	Mode display	RO	INT8	-	0~10
0x6062	00	Position instruction	RO	INT32	Instruction unit/s	-
0x6063	00	Position feedback	RO	INT32	Coder unit	-
0x6064	00	Actual Position Feedback time	RO	INT32	Instruction unit/s	-
0x6065	00	Threshold for excessive positional deviation	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x6067	00	Position has reached the threshold	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x6068	00	Position reaches the window time	RW	UINT16	1ms	0~65535
0x606C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x6072	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x607A	00	Target Position Setting	RW	INT32	Instruction unit/s	-2^{31}~(2^{31}-1)
0x6091	01	Motor resolution	RW	UINT32	-	1~(2^{32}-1)
	02	Axis resolution	RW	UINT32	-	1~(2^{32}-1)
0x60B0	00	Position offset	RW	INT32	Instruction unit/s	-2^{31}~(2^{31}-1)
0x60F4	00	Position deviation	RO	INT32	Coder unit	-
0x60FC	00	Position instruction	RO	INT32	Coder unit	-

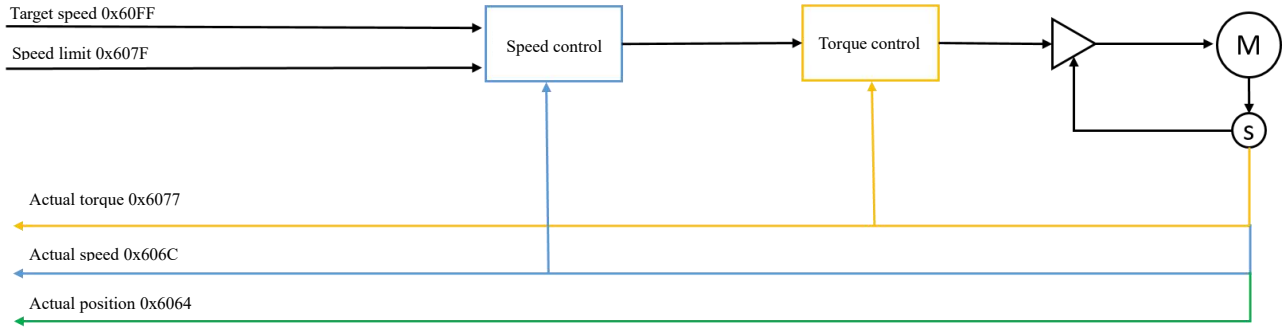
Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x683F	00	Error code	RO	UINT16	-	0~65535
0x6840	00	Control word	RW	UINT16	-	0~65535
0x6841	00	State word	RO	UINT16	-	0~65535
0x6860	00	MODE	RW	INT8	-	0~10
0x6861	00	Mode display	RO	INT8	-	0~10
0x6862	00	Position instruction	RO	INT32	Instruction unit/s	-
0x6863	00	Position feedback	RO	INT32	Coder unit	-
0x6864	00	Actual Position Feedback time	RO	INT32	Instruction unit/s	-
0x6865	00	Threshold for excessive positional deviation	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x6867	00	Position has reached the threshold	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x6868	00	Position reaches the window time	RW	UINT16	1ms	0~65535
0x686C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x6872	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x687A	00	Target Position Setting	RW	INT32	Instruction unit/s	-2^{31}~(2^{31}-1)
0x6891	01	Motor resolution	RW	UINT32	-	1~(2^{32}-1)
	02	Axis resolution	RW	UINT32	-	1~(2^{32}-1)
0x68B0	00	Position offset	RW	INT32	Instruction unit/s	-2^{31}~(2^{31}-1)
0x68F4	00	Position deviation	RO	INT32	Coder unit	-
0x68FC	00	Position instruction	RO	INT32	Coder unit	-

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x703F	00	Error code	RO	UINT16	-	0~65535
0x7040	00	Control word	RW	UINT16	-	0~65535
0x7041	00	State word	RO	UINT16	-	0~65535
0x7060	00	MODE	RW	INT8	-	0~10
0x7061	00	Mode display	RO	INT8	-	0~10
0x7062	00	Position instruction	RO	INT32	Instruction unit/s	-
0x7063	00	Position feedback	RO	INT32	Coder unit	-
0x7064	00	Actual Position Feedback time	RO	INT32	Instruction unit/s	-
0x7065	00	Threshold for excessive positional deviation	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x7067	00	Position has reached the threshold	RW	UINT32	Instruction unit/s	0~(2^{32}-1)
0x7068	00	Position reaches the window time	RW	UINT16	1ms	0~65535
0x706C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x7072	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x707A	00	Target Position Setting	RW	INT32	Instruction unit/s	-2^{31}~(2^{31}-1)
0x7091	01	Motor resolution	RW	UINT32	-	1~(2^{32}-1)

	02	Axis resolution	RW	UINT32	-	1~(2^{32}-1)
0x70B0	00	Position offset	RW	INT32	Instruction unit/s	-2^{31}~(2^{31}-1)
0x70F4	00	Positional deviation	RO	INT32	Coder unit	-
0x70FC	00	Position instruction	RO	INT32	Coder unit	-

9.4.5 Cyclic Synchronous Velocity Mode (CSV)

In Cyclic Synchronous Velocity Mode, the master station sends the calculated Target speed of 60FFh to the servo drive in periodic synchronization, and the speed and torque are adjusted internally by the servo.



Related Object Dictionary

Index	Sub Index	Name	Reading and writing	Data type	unit	Setting Range
0x603F	00	Error code	RO	UINT16	-	0~65535
0x6040	00	Control word	RW	UINT16	-	0~65535
0x6041	00	State word	RO	UINT16	-	0~65535
0x6060	00	MODE	RW	INT8	-	0~10
0x6061	00	Mode display	RO	INT8	-	0~10
0x6063	00	Position feedback	RO	INT32	Coder unit	-
0x6064	00	Actual Position Feedback time	RO	INT32	Instruction unit/s	
0x606C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x6072	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x6077	00	Actual torque	RO	INT16	0.1%	-
0x607F	00	maximum speed	RW	UINT32	0.1 rpm	0~60000
0x60E0	00	Positive torque limit	RW	UINT16	0.1%	0~3000
0x60E1	00	Negative torque limit	RW	UINT16	0.1%	0~3000
0x6091	01	Motor resolution	RW	UINT32	-	1~(2^{32}-1)
	02	Axis resolution	RW	UINT32	-	1~(2^{32}-1)
0x60FF	00	Target speed	RW	INT32	0.1 rpm	-60000~60000

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x683F	00	Error code	RO	UINT16	-	0~65535
0x6840	00	Control word	RW	UINT16	-	0~65535
0x6841	00	State word	RO	UINT16	-	0~65535
0x6860	00	MODE	RW	INT8	-	0~10

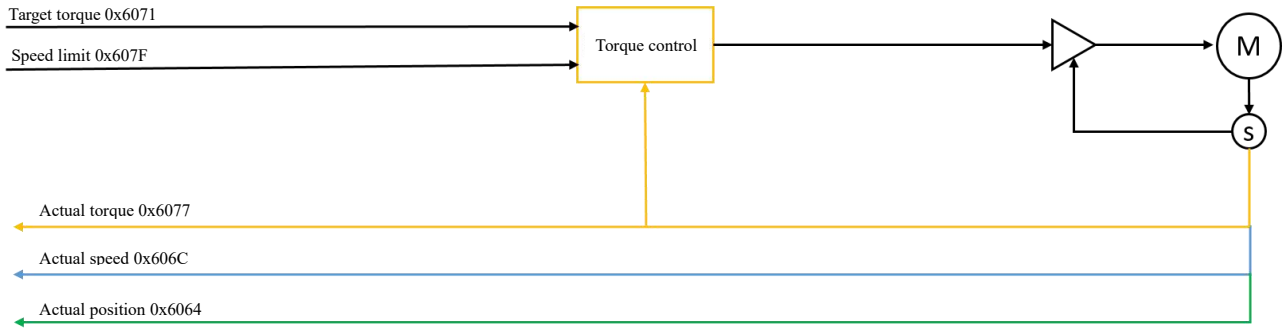
0x6861	00	Mode display	RO	INT8	-	0~10
0x6863	00	Position feedback	RO	INT32	Coder unit	-
0x6864	00	Actual Position Feedback time	RO	INT32	Instruction unit/s	
0x686C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x6872	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x6877	00	Actual torque	RO	INT16	0.1%	-
0x687F	00	maximum speed	RW	UINT32	0.1 rpm	0~60000
0x68E0	00	Positive torque limit	RW	UINT16	0.1%	0~3000
0x68E1	00	Negative torque limit	RW	UINT16	0.1%	0~3000
0x6891	01	Motor resolution	RW	UINT32	-	1~(2^{32}-1)
	02	Axis resolution	RW	UINT32	-	1~(2^{32}-1)
0x68FF	00	Target speed	RW	INT32	0.1 rpm	6000~6000

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x703F	00	Error code	RO	UINT16	-	0~65535
0x7040	00	Control word	RW	UINT16	-	0~65535
0x7041	00	State word	RO	UINT16	-	0~65535
0x7060	00	MODE	RW	INT8	-	0~10
0x7061	00	Mode display	RO	INT8	-	0~10
0x7063	00	Position feedback	RO	INT32	Coder unit	-
0x7064	00	Actual Position Feedback time	RO	INT32	Instruction unit/s	
0x706C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x7072	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x7077	00	Actual torque	RO	INT16	0.1%	-
0x707F	00	maximum speed	RW	UINT32	0.1 rpm	0~60000
0x70E0	00	Positive torque limit	RW	UINT16	0.1%	0~3000
0x70E1	00	Negative torque limit	RW	UINT16	0.1%	0~3000
0x7091	01	Motor resolution	RW	UINT32	-	1~(2^{32}-1)
	02	Axis resolution	RW	UINT32	-	1~(2^{32}-1)
0x70FF	00	Target speed	RW	INT32	0.1 rpm	6000~6000

Note: The speed limit value is determined by the smaller of 0x607F, 0x687F, or 0x707F and the maximum motor speed.

9.4.6 Cyclic Synchronous Torque Mode (CST)

In the periodic synchronous torque mode, the master station sends the calculated Target torque 6071h to the servo drive in periodic synchronization, and the torque adjustment is executed internally by the servo. When the speed reaches the limit amplitude, enter the speed regulation stage.



Related Object Dictionary

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x603F	00	Error code	RO	UINT16	-	0~65535
0x6040	00	Control word	RW	UINT16	-	0~65535
0x6041	00	State word	RO	UINT16	-	0~65535
0x6060	00	MODE	RW	INT8	-	0~10
0x6061	00	Mode display	RO	INT8	-	0~10
0x6064	00	Actual Position Feedback time	RO	INT32	Instruction unit/s	-
0x606C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x6071	00	Target torque	RW	INT16	0.1%	-3000~3000
0x6072	00	Maximum torque	RW	INT16	0.1%	-3000~3000
0x6077	00	Actual torque	RO	INT16	0.1%	-
0x607F	00	maximum speed	RW	UINT32	0.1 rpm	0~60000
0x60E0	00	Positive torque limit	RW	UINT16	0.1%	0~3000
0x60E1	00	Negative torque limit	RW	UINT16	0.1%	0~3000

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x683F	00	Error code	RO	UINT16	-	0~65535
0x6840	00	Control word	RW	UINT16	-	0~65535
0x6841	00	State word	RO	UINT16	-	0~65535
0x6860	00	MODE	RW	INT8	-	0~10
0x6861	00	Mode display	RO	INT8	-	0~10
0x6864	00	Actual Position Feedback time	RO	INT32	Instruction unit/s	-
0x686C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x6871	00	Target torque	RW	INT16	0.1%	-3000~3000
0x6872	00	Maximum torque	RW	INT16	0.1%	-3000~3000

0x6877	00	Actual torque	RO	INT16	0.1%	-
0x687F	00	maximum speed	RW	UINT32	0.1 rpm	0~60000
0x68E0	00	Positive torque limit	RW	UINT16	0.1%	0~3000
0x68E1	00	Negative torque limit	RW	UINT16	0.1%	0~3000

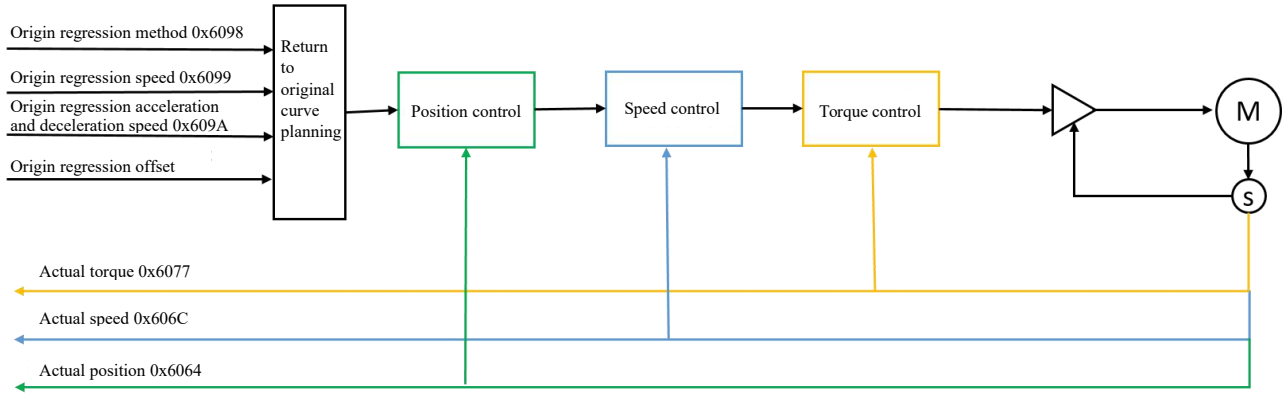
Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x703F	00	Error code	RO	UINT16	-	0~65535
0x7040	00	Control word	RW	UINT16	-	0~65535
0x7041	00	State word	RO	UINT16	-	0~65535
0x7060	00	MODE	RW	INT8	-	0~10
0x7061	00	Mode display	RO	INT8	-	0~10
0x7064	00	Actual Position Feedback time	RO	INT32	Instruction unit/s	-
0x706C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x7071	00	Target torque	RW	INT16	0.1%	-3000~3000
0x7072	00	Maximum torque	RW	INT16	0.1%	-3000~3000
0x7077	00	Actual torque	RO	INT16	0.1%	-
0x707F	00	maximum speed	RW	UINT32	0.1 rpm	0~60000
0x70E0	00	Positive torque limit	RW	UINT16	0.1%	0~3000
0x70E1	00	Negative torque limit	RW	UINT16	0.1%	0~3000

Note: The speed limit value is determined by the smaller of 0x607F, 0x687F, or 0x707F and the maximum motor speed.

9.4.7 Homing Mode (HM)

Homing mode is used to find the mechanical origin and determine the position relationship between the mechanical origin and the mechanical zero point.
Mechanical origin: A fixed position on a machine that corresponds to a certain determined origin signal switch.
Mechanical origin=Mechanical zero point+607C (origin offset)
Mechanical zero point: an absolute 0 position on the machine.
After the servo drive completes homing, the motor will stop at the mechanical origin. The position relationship between the mechanical origin and the mechanical zero point can be adjusted by setting the value of the object dictionary 0x607C.

Return to Zero Control Block Diagram



Related Object Dictionary

Control word 6040h		
Position	**Name**	**Describe**
0	Servo ready(Switch On)	0:Invalid；1:Effective
1	Connect the main circuit power(Enable Voltage)	0:Invalid；1:Effective
2	Fast stop(Quick Stop)	0:Effective；1:Invalid
3	Servo operation(Enable Operation)	0:Invalid；1:Effective
4	Start homing(Homing Start)	0>1:Start homing 1: Homing in progress 1> 0: Homing completion
8	Halt (pause)	0: Bit4 decides whether to return to zero or not 1: Set the servo to pause at 605Dh

State word6041h		
Position	**Name**	**Describe**
10	Target achieved(Target Reached)	0:Target Position Setting 未到达 1:Target Position Setting 到达
12	zeroing(Home attained)	0:zeroing 未成功 1:zeroing 成功
13	zeroing error(Homing Error)	0:zeroing 无 error 1:zeroing 发生 Position 置偏差过大故障
15	homing completed(Home Find)	0: homing not completed 1:homing completed

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x603F	00	Error code	RO	UINT16	-	0~65535
0x6040	00	Control word	RW	UINT16	-	0~65535
0x6041	00	State word	RO	UINT16	-	0~65535
0x6060	00	MODE	RW	INT8	-	0~10
0x6061	00	Mode display	RO	INT8	-	0~10
0x6062	00	Instruction Position setting	RO	INT32	Instruction unit/s	-
0x6064	00	Actual Position Feedback time	RO	INT32	Instruction unit/s	-
0x606C	00	Actual speed feedback	RO	INT32	Instruction unit/s	-
0x6067	00	Position has reached the threshold	RO	UINT32	Instruction unit/s	-
0x6068	00	Position reaches the window	RW	UINT16	1ms	-
0x6072	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x6077	00	Actual torque	RO	INT16	0.1%	-
0x6098	00	Origin zeroing method	RW	INT8	-	1~35
0x6099	01	High speed search for deceleration points	RW	UINT32	0.1 rpm	0~30000
	02	Search origin low speed	RW	UINT32	0.1 rmp	0~30000
0x609A	00	Acceleration	RW	UINT32	ms	0~60000
0x60F4	00	Positional deviation	RO	INT32	Coder unit	-

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x683F	00	Error code	RO	UINT16	-	0~65535
0x6840	00	Control word	RW	UINT16	-	0~65535
0x6841	00	State word	RO	UINT16	-	0~65535
0x6860	00	MODE	RW	INT8	-	0~10
0x6861	00	Mode display	RO	INT8	-	0~10
0x6862	00	Instruction Position setting	RO	INT32	Instruction unit/s	-
0x6864	00	Actual Position Feedback time	RO	INT32	Instruction unit/s	-
0x686C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x6867	00	Position has reached the threshold	RO	UINT32	Instruction unit/s	-
0x6868	00	Position reaches the window	RW	UINT16	1ms	-
0x6872	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x6877	00	Actual torque	RO	INT16	0.1%	-
0x6898	00	Origin zeroing method	RW	INT8	-	1~35
0x6899	01	High speed search for deceleration points	RW	UINT32	0.1 rpm	0~30000
	02	Search origin low speed	RW	UINT32	0.1 rpm	0~30000
0x689A	00	Acceleration	RW	UINT32	0.1 rpm	0~60000
0x68F4	00	Positional deviation	RO	INT32	Coder unit	-

Index	Sub Index	Name	Reading and writing	Data type	Unit	Setting Range
0x703F	00	Error code	RO	UINT16	-	0~65535
0x7040	00	Control word	RW	UINT16	-	0~65535
0x7041	00	State word	RO	UINT16	-	0~65535
0x7060	00	MODE	RW	INT8	-	0~10
0x7061	00	Mode display	RO	INT8	-	0~10
0x7062	00	Instruction Position setting	RO	INT32	Instruction unit/s	-
0x7064	00	Actual Position Feedback time	RO	INT32	Instruction unit/s	-
0x706C	00	Actual speed feedback	RO	INT32	0.1 rpm	-
0x7067	00	Position has reached the threshold	RO	UINT32	Instruction unit/s	-
0x7068	00	Position reaches the window	RW	UINT16	1ms	-
0x7072	00	Maximum torque	RW	INT16	0.1%	3000~3000
0x7077	00	Actual torque	RO	INT16	0.1%	-
0x7098	00	Origin zeroing method	RW	INT8	-	1~35
0x7099	01	High speed search for deceleration points	RW	UINT32	0.1 rpm	0~30000
	02	Search origin low speed	RW	UINT32	0.1 rpm	0~30000
0x709A	00	Acceleration	RW	UINT32	0.1 rpm	0~60000
0x70F4	00	Positional deviation	RO	INT32	Coder unit	-

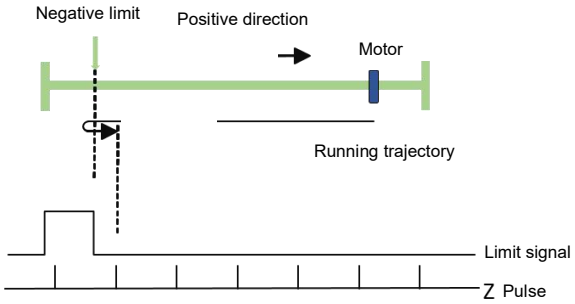
Introduction to Zeroing Method:

M900 series servo 6098 is the zeroing mode for axis 1, 6898 is the zeroing mode for axis 2, and 7098 is the zeroing mode for axis 3

Taking axis 1 as an example, it will not be further elaborated.

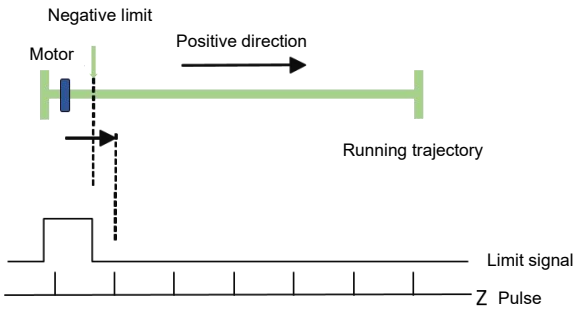
Origin zeroing method 1 (6098 00h=1)

1. Starting from the origin zeroing
2. Reverse high-speed to find the negative limit position
3. Encountering the rising edge of the negative limit Position
4. Slow down to 0
5. Look for the negative limit position at low speed in the positive direction, and find the falling edge
6. Forward looking for Z-pulse



Origin zeroing method 1-a

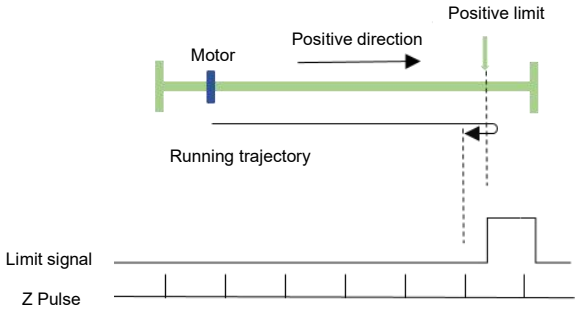
7. Start Origin Regression
8. Negative limit
9. Position
10. Effective
11. Find the negative limit position at low speed in the positive direction, and the falling edge
12. Forward looking for Z-pulse



Origin zeroing method 1-b

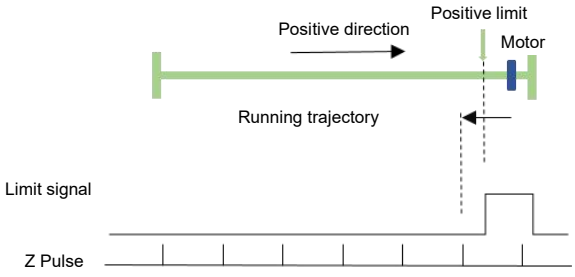
Origin zeroing method 2 (6098 00h=2)

1. Starting from the origin zeroing
2. Positive high-speed alignment limit
3. Position
4. Encountering the rising edge of the positive limit
5. Position
6. Slow down to 0
7. Reverse low-speed alignment limit
8. Position falling edge
9. Reverse search for Z-pulse



Origin zeroing method2-a

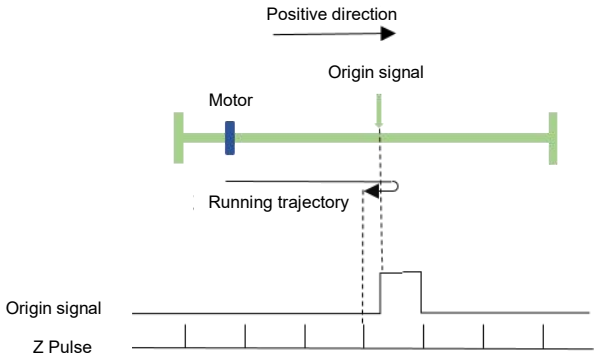
1. Start origin regression
2. Positive limit
3. Position
4. Effective
5. Reverse low-speed alignment limit
6. Position falling edge
7. Reverse search for Z-pulse



Origin zeroing method2-b

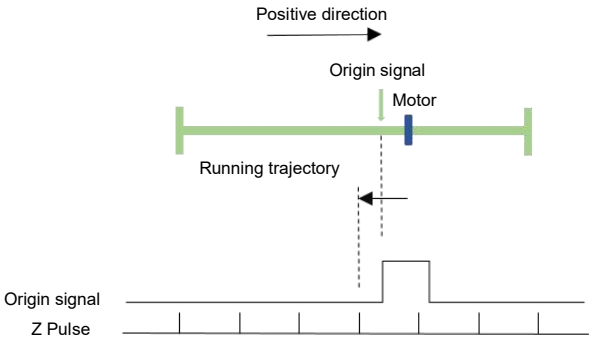
Origin zeroing method3（6098 00h =3）

1. Starting from the origin zeroing
2. The origin signal is OFF
3. Forward high-speed search for the rising edge of the origin signal
4. Slow down to 0
5. Reverse low-speed search for the origin signal falling edge
6. Reverse search for Z-pulse



Origin zeroing method3-a

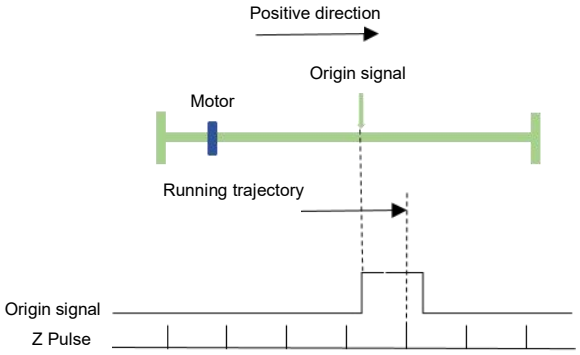
1. Starting from the origin zeroing
2. Origin signal ON
3. Reverse low-speed search for the origin and descent edge
4. Reverse search for Z-pulse



Origin zeroing method3-b

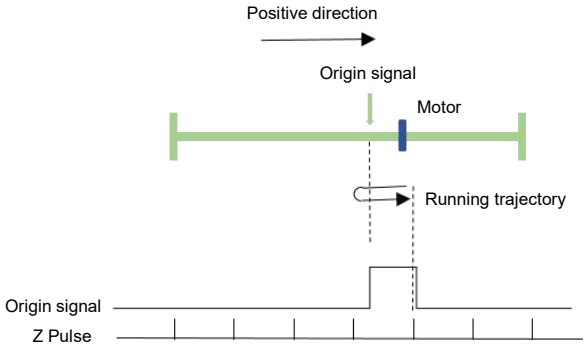
Origin zeroing method4（6098 00h =4）

1. Starting from the origin zeroing
2. Origin signal OFF
3. Forward low-speed search for the origin rising edge
4. Look for Z-pulse at low speed in the forward direction
5. Forward looking for Z-pulse



Origin zeroing method4-a

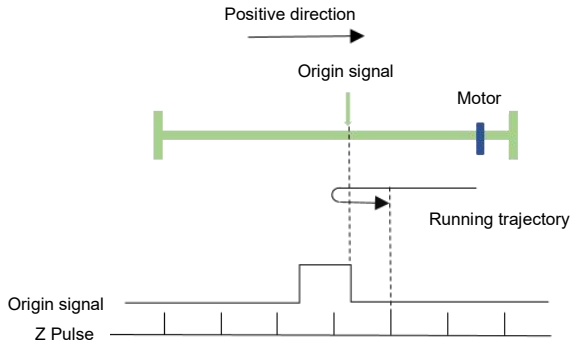
1. Starting Origin Regression
2. Origin signal ON
3. Reverse low-speed search for the origin and descent edge
4. Forward low-speed search for the origin rising edge
5. Forward looking for Z-pulse



Origin zeroing method4-b

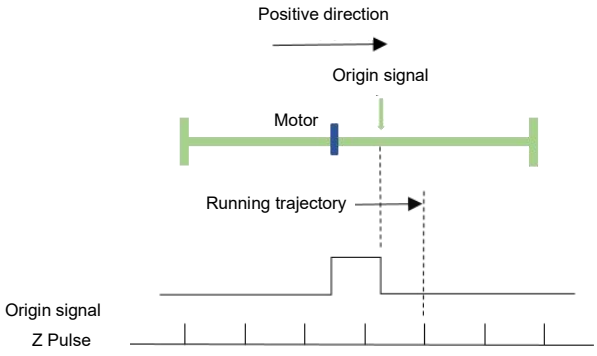
Origin zeroing method5（6098 00h =5）

1. Starting from the origin zeroing
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Slow down to 0
5. Find the origin and descending edge at low speed in the forward direction
6. Forward looking for Z-pulse



Origin zeroing method5-a

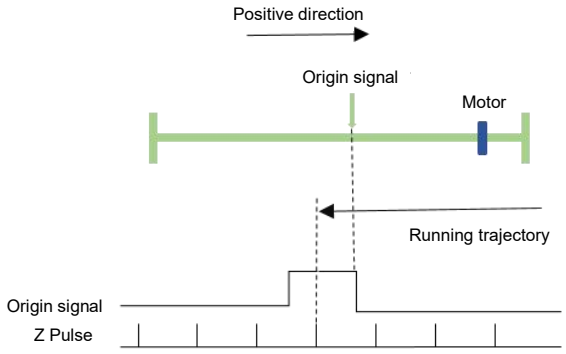
7. Starting from the origin zeroing
8. Origin signal ON
9. Find the origin and descending edge at low speed in the forward direction
10. Forward looking for Z-pulse



Origin zeroing method5-b

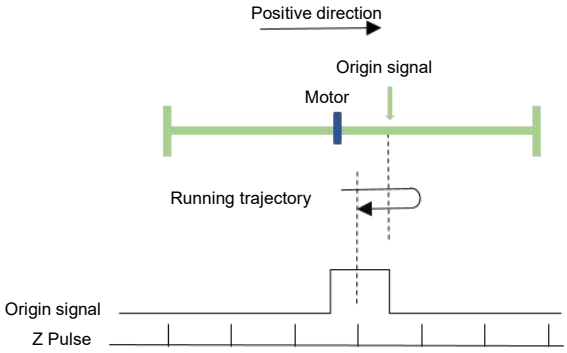
Origin zeroing method6（6098 00h =6）

1. Starting Origin Regression
2. Origin signal OFF
3. Reverse low-speed search for the origin rising edge
4. Reverse low-speed search for Z-pulse shutdown



Origin zeroing method6-a

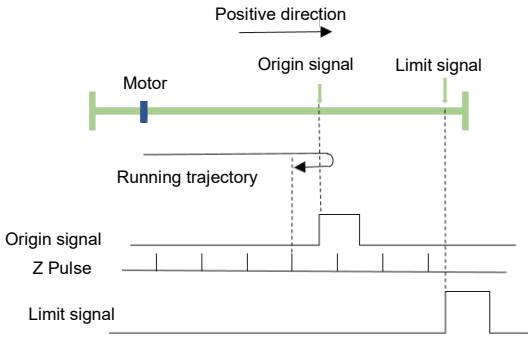
1. Starting Origin Regression
2. Origin signal ON
3. Find the origin and descending edge at low speed in the forward direction
4. Reverse low-speed search for the origin rising edge
5. Reverse search for Z-pulse



Origin zeroing method6-b

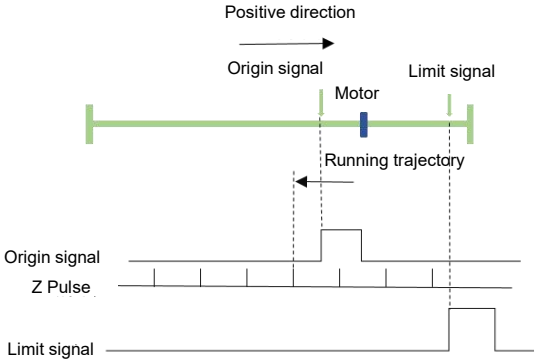
Origin zeroing method7（6098 00h =7）

1. Starting from the origin zeroing
2. Origin signal OFF
3. Find the origin rising edge on the forward highway
4. Slow down to 0
5. Reverse low-speed search for the origin and descent edge
6. Reverse search for Z-pulse



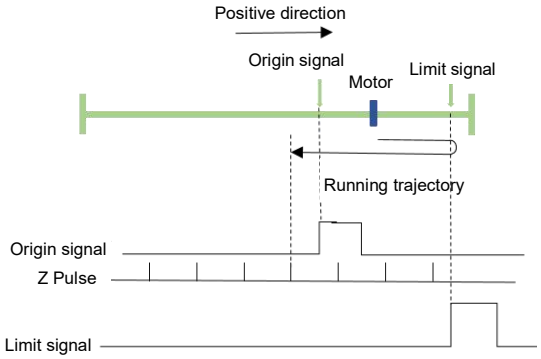
Origin zeroing method7-a

1. Starting from the origin zeroing
2. Origin signal ON
3. Reverse low-speed search for the origin and descent edge
4. Reverse search for Z-pulse



Origin zeroing method7-b

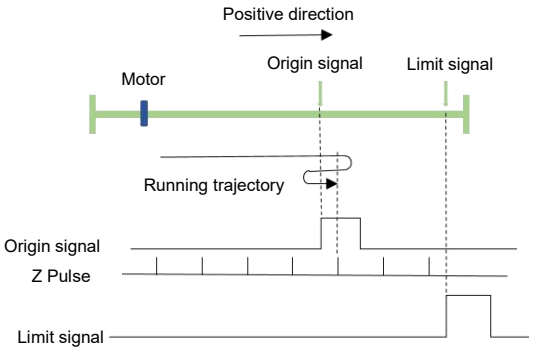
1. Starting from the origin zeroing
2. Origin OFF
3. Find the origin rising edge on the forward highway
4. Encountering the positive limit position
5. Reverse high-speed search for the origin rising edge
6. Reverse low-speed search for the origin and descent edge
7. Reverse search for Z-pulse



Origin zeroing method7-c

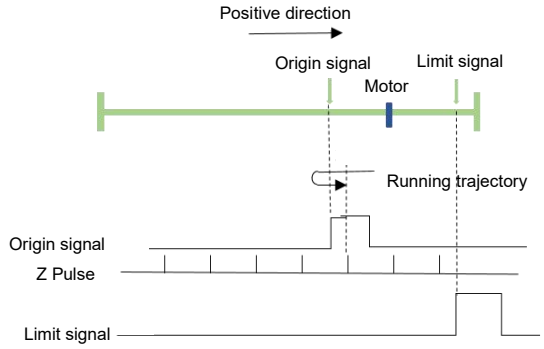
Origin zeroing method8（6098 00h =8）

1. Starting from the origin zeroing
2. Origin signal OFF
3. Find the origin rising edge on the forward highway
4. Slow down to 0
5. Reverse low-speed search for the origin and descent edge
6. Forward low-speed search for the origin rising edge
7. Forward looking for Z-pulse



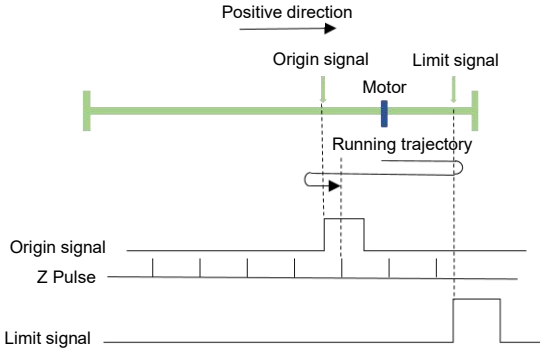
Origin zeroing method8-a

1. Starting from the origin zeroing
2. Origin signal ON
3. Reverse low-speed search for the origin and descent edge
4. Forward low-speed search for the origin rising edge
5. Forward looking for Z-pulse



Origin zeroing method8-b

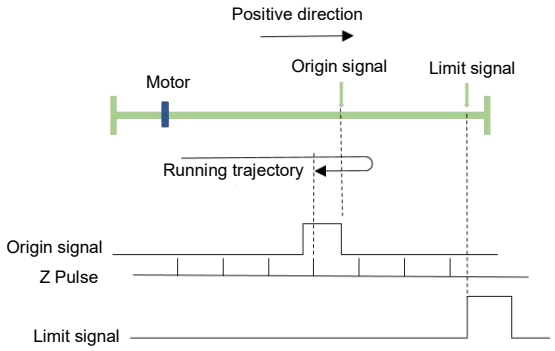
1. Starting from the origin zeroing
2. Origin OFF
3. Find the origin rising edge on the forward highway
4. Encountering the positive limit position
5. Reverse high-speed search for the origin and descent edge
6. Slow down to 0
7. Forward low-speed search for the origin rising edge
8. Forward looking for Z-pulse



Origin zeroing method8-c

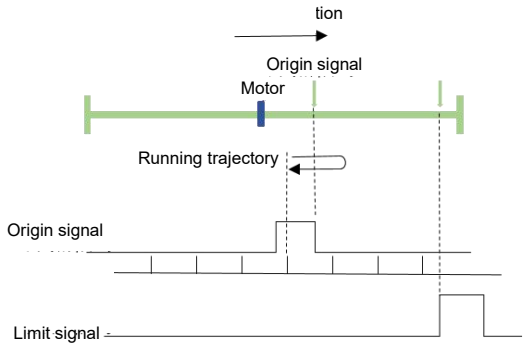
Origin zeroing method9（6098 00h =9）

1. Starting from the origin zeroing
2. Origin signal OFF
3. Find the origin rising edge on the forward highway
4. Reverse low-speed search for the origin and descent edge
5. Slow down to
6. Reverse low-speed search for the origin rising edge
7. Reverse search for Z-pulse



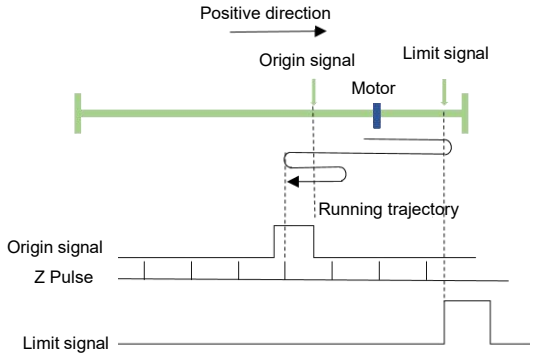
Origin zeroing method9-a

1. Starting from the origin zeroing
2. Origin signal ON
3. Find the origin and descending edge of the forward highway
4. Slow down to
5. Reverse low-speed search for the origin rising edge
6. Reverse search for Z-pulse



Origin zeroing method9-b

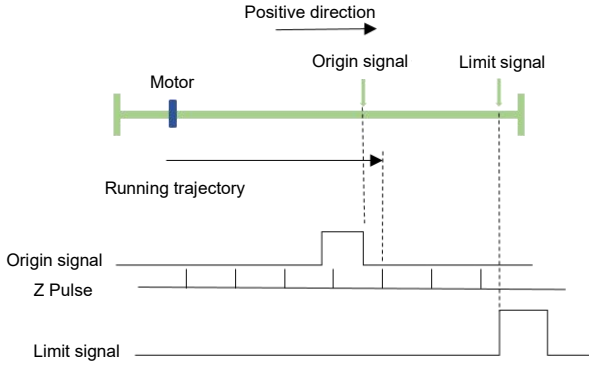
1. Starting Origin Regression
2. Origin OFF
3. Find the origin rising edge on the forward highway
4. Encountering the positive limit position
5. Reverse high-speed search for the origin rising edge
6. Slow down to
7. Find the origin and descending edge at low speed in the forward direction
8. Reverse low-speed search for the origin rising edge
9. Reverse search for Z-pulse



Origin zeroing method9-c

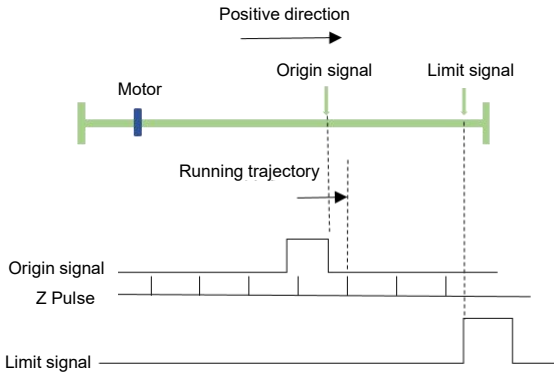
Origin zeroing method10（6098 00h =10）

1. Starting Origin Regression
2. Origin signal OFF
3. Find the origin rising edge on the forward highway
4. Find the origin and descending edge at low speed in the forward direction
5. Forward looking for Z-pulse



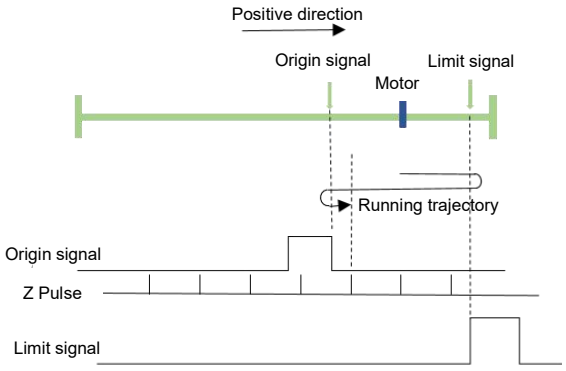
Origin zeroing method10-a

1. Starting Origin Regression
2. Origin signal ON
3. Find the origin and descending edge at low speed in the forward direction
4. Forward looking for Z-pulse



Origin zeroing method10-b

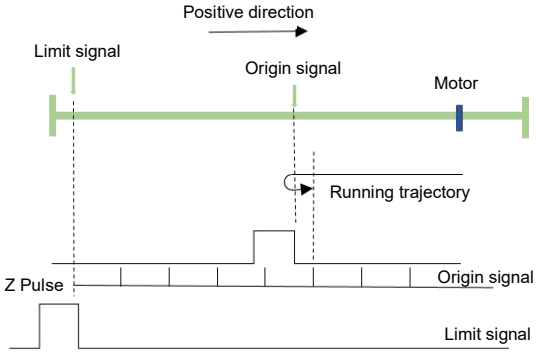
1. Starting from the origin zeroing
2. Origin OFF
3. Find the origin rising edge on the forward highway
4. Encountering the positive limit position
5. Reverse high-speed search for the origin rising edge
6. Slow down to
7. Find the origin and descending edge at low speed in the forward direction
8. Forward looking for Z-pulse



Origin zeroing method10-c

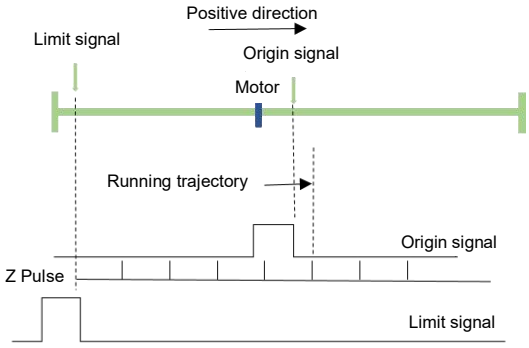
Origin zeroing method11（6098 00h =11）

1. Origin zeroing begins
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Slow down to
5. Find the origin and descending edge at low speed in the forward direction
6. Forward looking for Z-pulse



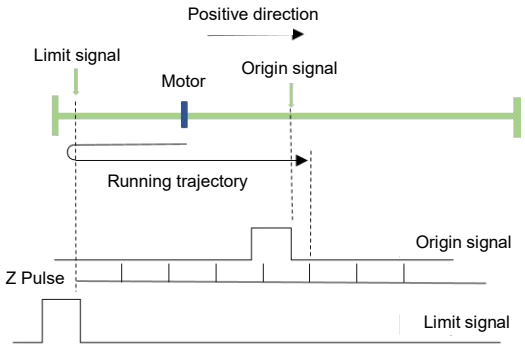
Origin zeroing method11-a

1. Origin zeroing begins
2. Origin signal ON
3. Find the origin and descending edge at low speed in the forward direction
4. Forward looking for Z-pulse



Origin zeroing method11-b

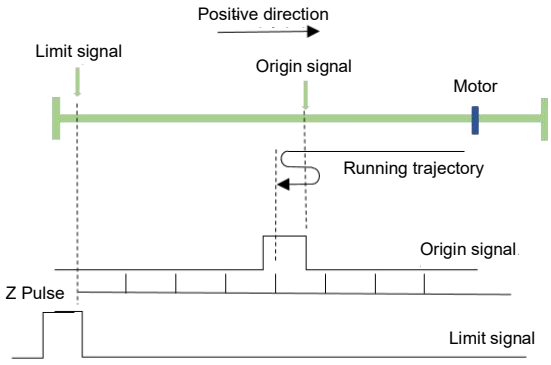
1. Origin zeroing begins
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Encountering negative limit position
5. Forward high-speed search for the rising edge of the origin signal
6. Forward low-speed finding of origin signal falling edge
7. Forward looking for Z-pulse



Origin zeroing method11-c

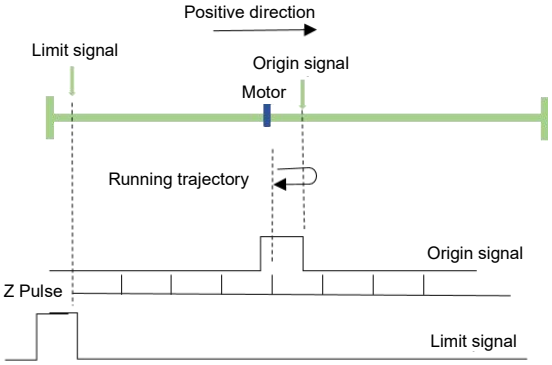
Origin zeroing method12（6098 00h =12）

1. Origin regression begins
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Slow down to
5. Find the origin and descending edge at low speed in the forward direction
6. Reverse low-speed search for the origin rising edge
7. Reverse search for Z-pulse



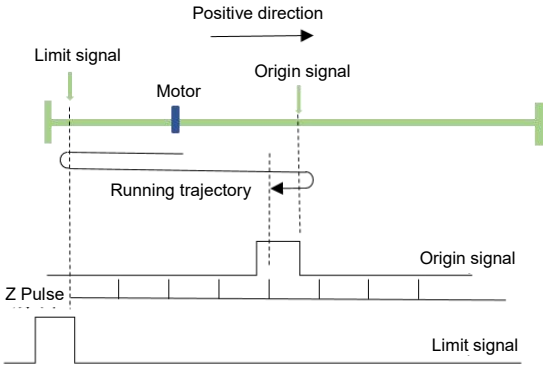
Origin zeroing method12-a

1. Origin regression begins
2. Origin signal ON
5. Find the origin and descending edge at low speed in the forward direction
6. Reverse low-speed search for the origin rising edge
7. Reverse search for Z-pulse



Origin zeroing method12-b

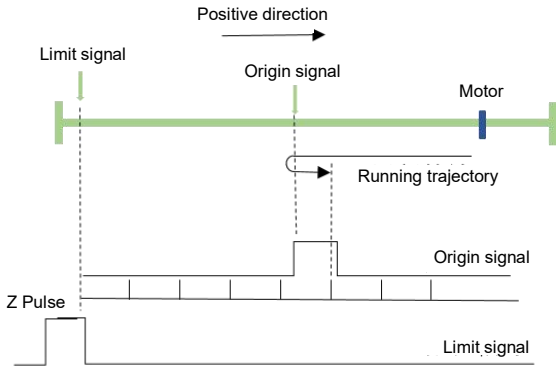
1. Origin regression begins
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Encountering negative limit position
5. Forward high-speed search for the origin signal falling edge
6. Slow down to
7. Reverse low-speed search for the origin rising edge
8. Reverse search for Z-pulse



Origin zeroing method12-c

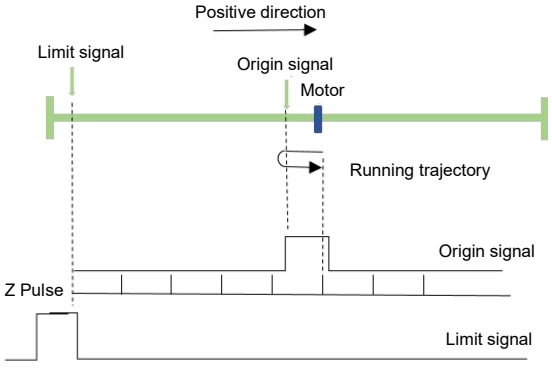
Origin zeroing method13（6098 00h =13）

1. Origin zeroing begins
2. Origin signal OFF
3. Reverse high-speed search for the origin and descent edge
4. Slow down to 0
5. Forward low-speed search for the origin rising edge
6. Forward looking for Z-pulse



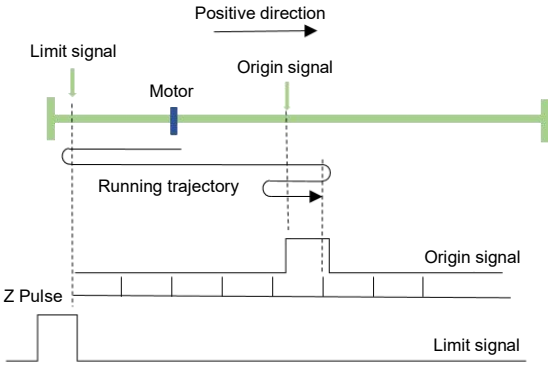
Origin zeroing method13-a

1. Origin zeroing begins
2. Origin signal ON
3. Reverse high-speed search for the origin and descent edge
4. Slow down to 0
5. Forward low-speed search for the origin rising edge
6. Forward looking for Z-pulse



Origin zeroing method13-b

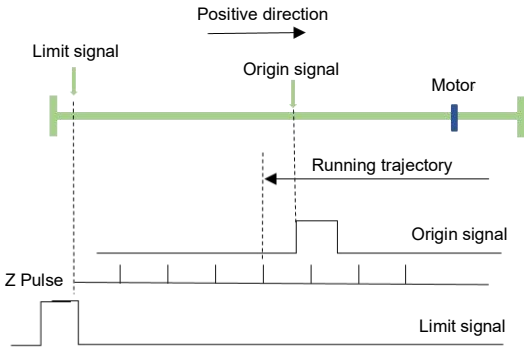
1. Origin regression begins
2. Origin signal OFF
3. Reverse high-speed search for the origin and descent edge
4. Encountering negative limit position
5. Forward high-speed search for the rising edge of the origin signal
6. Slow down to 0
7. Reverse low-speed search for the origin signal falling edge
8. Forward low-speed origin signal rising edge
9. Forward looking for Z-pulse



Origin zeroing method13-c

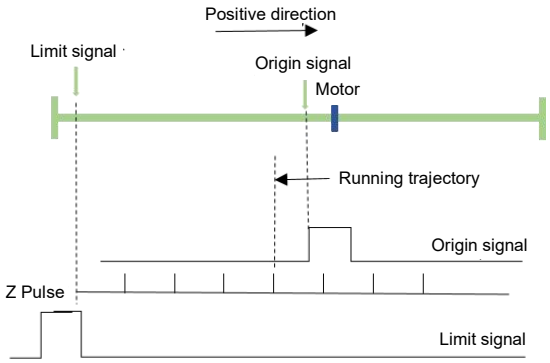
Origin zeroing method14（6098 00h =14）

1. Origin regression begins
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Reverse low-speed search for the origin and descent edge
5. Reverse search for Z-pulse



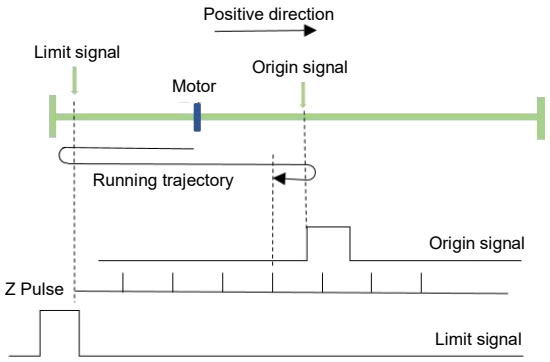
Origin zeroing method14-a

1. Origin regression begins
2. Origin signal ON
3. Reverse low-speed search for the origin and descent edge
4. Reverse search for Z-pulse



Origin zeroing method14-b

1. Origin zeroing begins
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Encountering negative limit position
5. Forward high-speed search for the rising edge of the origin signal
6. Slow down to 0
7. Reverse low-speed search for the origin signal falling edge
8. Reverse search for Z-pulse



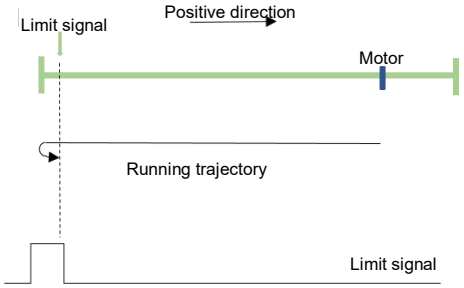
Origin zeroing method14-c

Origin zeroing method15（6098 00h =15）:reserve。

Origin zeroing method16（6098 00h =16）:reserve。

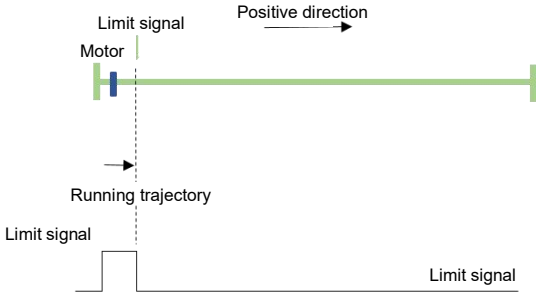
Origin zeroing method17（6098 00h =17）

1. Starting Origin Regression
2. Reverse high-speed to find the negative limit position
3. Encountering the rising edge of the negative limit Position
4. Slow down to 0
5. Find the negative limit position at low speed and stop the machine after the falling edge



Origin zeroing method17-a

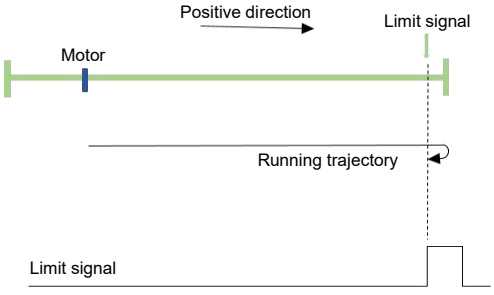
1. Starting Origin Regression
2. Negative limit
3. Position
4. Effective
5. Find the negative limit position at low speed and stop the machine after the falling edge



Origin zeroing method17-b

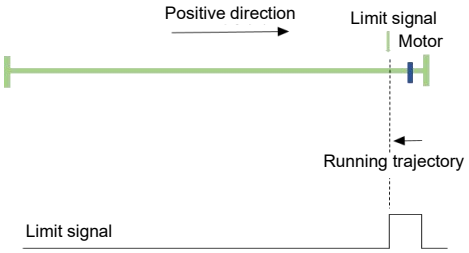
Origin zeroing method18（6098 00h =18）

1. Starting Origin Regression
2. Positive high-speed alignment limit
3. Position
4. Encountering the rising edge of the positive limit
5. Position
6. Slow down to 0
7. Stop the machine after the decrease of the position limit in reverse low-speed alignment



Origin zeroing method18-a

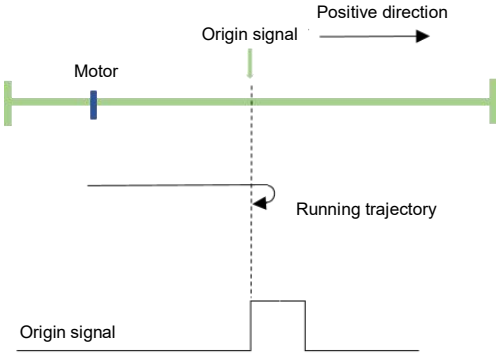
1. Starting Origin Regression
2. Positive limit position
3. Effective
4. Stop the machine after the decrease of the position limit in reverse low-speed alignment



Origin zeroing method18-b

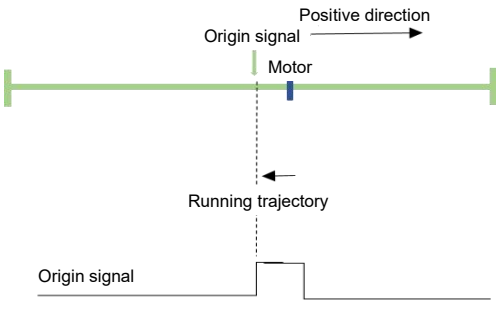
Origin zeroing method19（6098 00h =19）

1. Starting Origin Regression
2. Find the origin position on the forward highway
3. Encounter the rising edge of the origin
4. Slow down to 0
5. Reverse low-speed search for the origin and descent edge
6. Rear shutdown



Origin zeroing method19-a

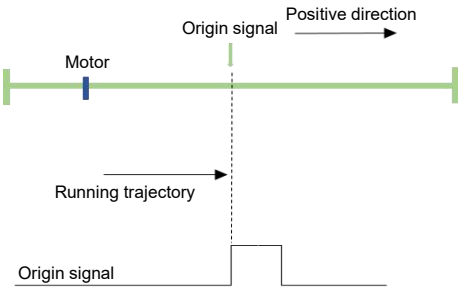
1. Starting Origin Regression
2. Positive limit position
3. Effective
4. Reverse low-speed search for the origin and descent edge
5. Rear shutdown



Origin zeroing method19-b

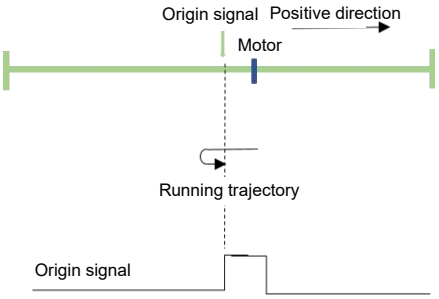
Origin zeroing method20（6098 00h =20）

1. Starting Origin Regression
2. Origin signal OFF
3. Find the origin rising edge at low speed in the forward direction
4. Rear shutdown



Origin zeroing method20-a

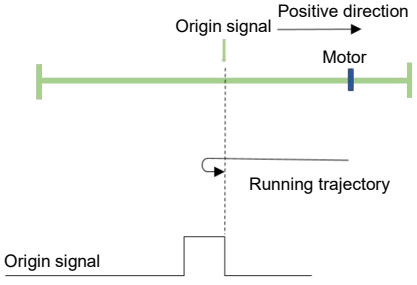
1. Starting Origin Regression
2. Origin signal ON
3. Reverse low-speed search for the origin and descent edge
4. Find the origin rising edge at low speed in the forward direction
5. Rear shutdown



Origin zeroing method20-b

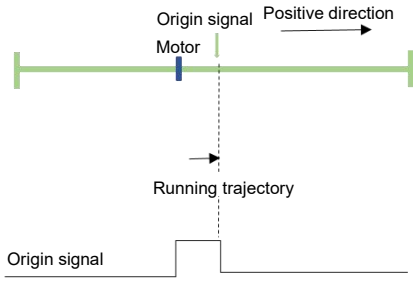
Origin zeroing method21（6098 00h =21）

1. Starting Origin Regression
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Slow down to 0
5. Find the origin and descending edge at low speed in the forward direction
6. Rear shutdown



Origin zeroing method21-a

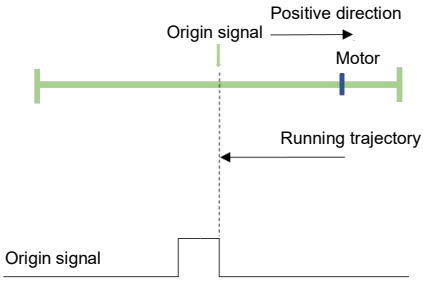
1. Starting Origin Regression
2. Origin signal ON
3. Find the origin and descending edge at low speed in the forward direction
4. Rear shutdown



Origin zeroing method21-b

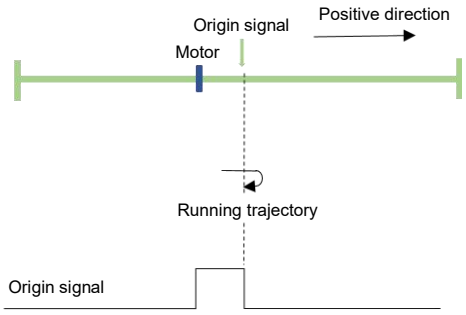
Origin zeroing method22（6098 00h =22）

1. Starting Origin Regression
2. Origin signal OFF
3. Reverse low-speed search for the origin rising edge
4. Rear shutdown



Origin zeroing method22-a

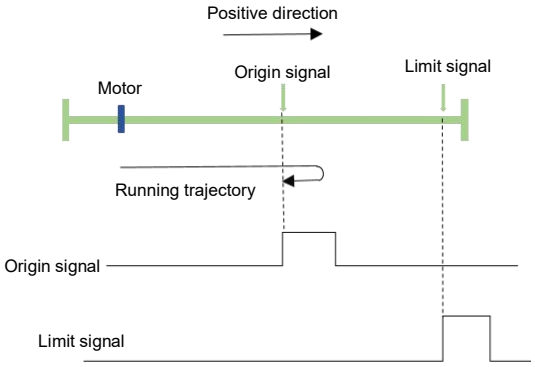
1. Starting Origin Regression
2. Origin signal ON
3. Find the origin and descending edge of the forward highway
4. Reverse low-speed search for the origin rising edge
5. Rear shutdown



Origin zeroing method22-b

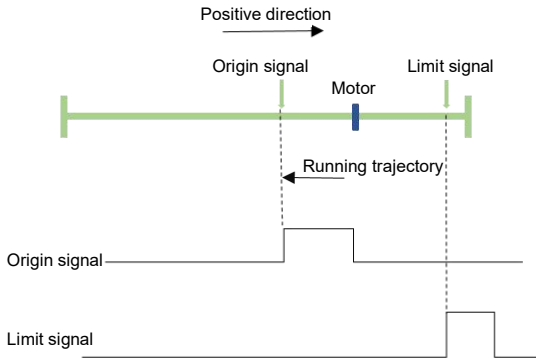
Origin zeroing method23（6098 00h =23）

1. Starting Origin Regression
2. Origin signal OFF
3. Find the origin rising edge on the forward highway
4. Slow down to 0
5. Reverse low-speed search for the origin and descent edge
6. Rear shutdown



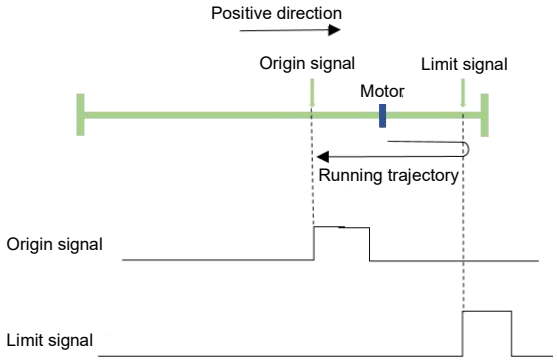
Origin zeroing method23-a

1. Starting Origin Regression
2. Origin signal ON
3. Reverse low-speed search for the origin and descent edge
4. Rear shutdown



Origin zeroing method23-b

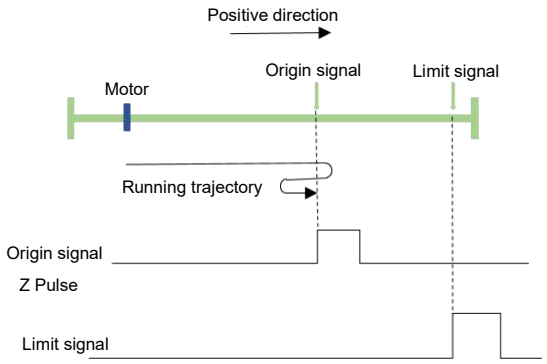
1. Starting Origin Regression
2. Origin OFF
3. Find the origin rising edge on the forward highway
4. Encountering the positive limit position
5. Reverse high-speed search for the origin rising edge
6. Reverse low-speed search for the origin and descent edge
7. Rear shutdown



Origin zeroing method23-c

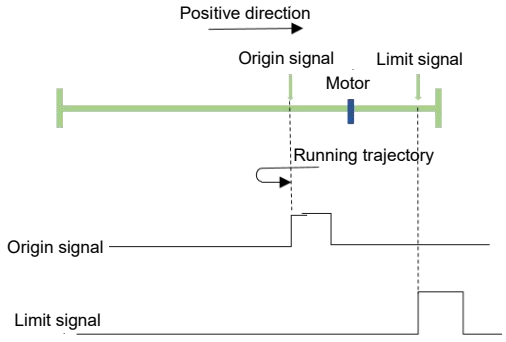
Origin zeroing method24（6098 00h =24）

1. Starting Origin Regression
2. Origin signal OFF
3. Find the origin rising edge on the forward highway
4. Slow down to 0
5. Reverse low-speed search for the origin and descent edge
6. Find the origin rising edge at low speed in the forward direction
7. Rear shutdown



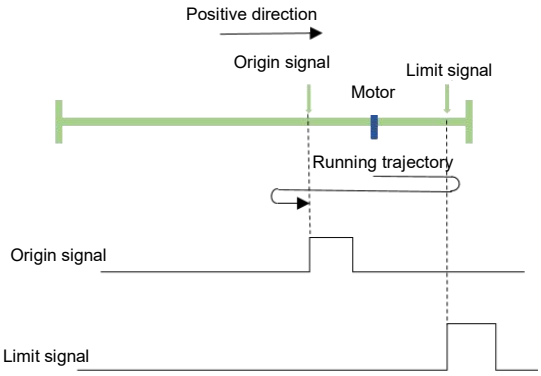
Origin zeroing method24-a

1. Starting Origin Regression
2. Origin signal ON
3. Reverse low-speed search for the origin and descent edge
4. Find the origin rising edge at low speed in the forward direction
5. Stop later



Origin zeroing method24-b

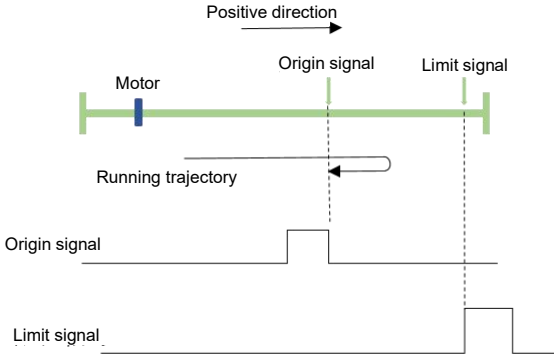
1. Starting Origin Regression
2. Origin OFF
3. Find the origin rising edge on the forward highway
4. Encountering the positive limit position
5. Reverse high-speed search for the origin and descent edge
6. Slow down to 0
7. Find the origin rising edge at low speed in the forward direction
8. Rear shutdown



Origin zeroing method24-c

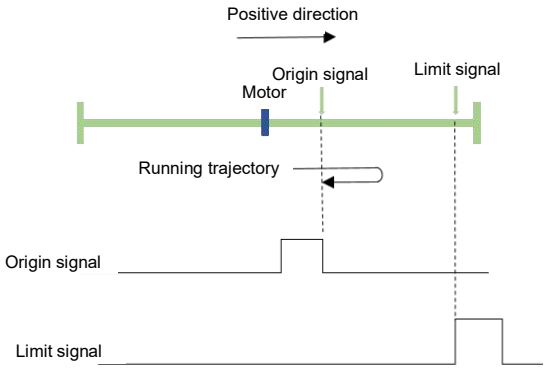
Origin zeroing method25（6098 00h =25）

1. Starting Origin Regression
2. Origin signal OFF
3. Find the origin rising edge on the forward highway
4. Find the origin and descending edge at low speed in the forward direction
5. Slow down to 0
6. Reverse low-speed search for the origin rising edge
7. Rear shutdown



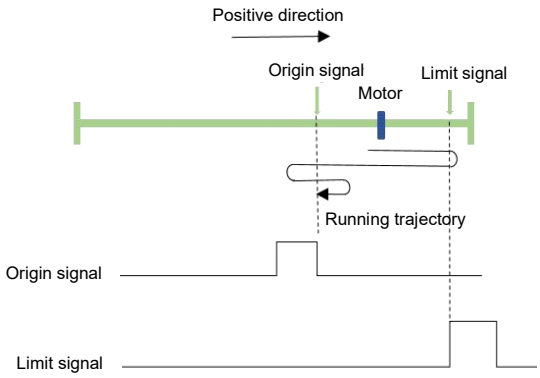
Origin zeroing method25-a

1. Starting Origin Regression
2. Origin signal ON
3. Find the origin and descending edge of the forward highway
4. Slow down to 0
5. Reverse low-speed search for the origin rising edge
6. Rear shutdown



Origin zeroing method25-b

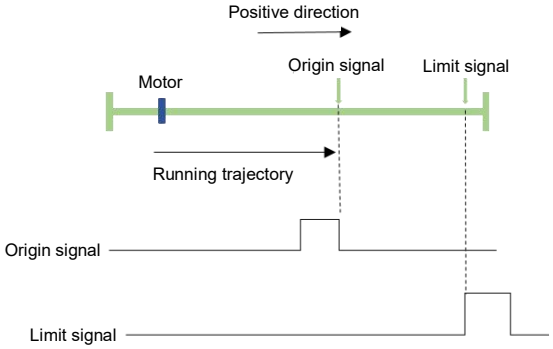
1. Starting Origin Regression
2. Origin OFF
3. Find the origin and descending edge of the forward highway
4. Encountering the positive limit position
5. Reverse high-speed search for the origin rising edge
6. Slow down to
7. Find the origin and descending edge at low speed in the forward direction
8. Reverse low-speed search for the origin rising edge
9. Rear shutdown



Origin zeroing method25-c

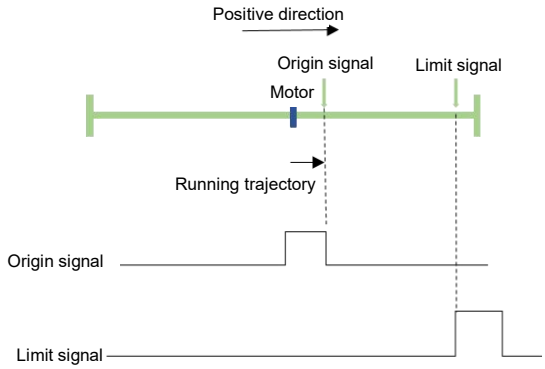
Origin zeroing method26（6098 00h =26）

1. Starting Origin Regression
2. Origin signal OFF
3. Find the origin rising edge on the forward highway
4. Find the origin and descending edge at low speed in the forward direction
5. Rear shutdown



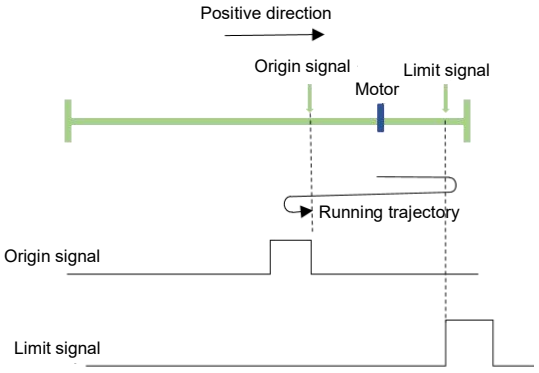
Origin zeroing method26-a

1. Starting Origin Regression
2. Origin signal ON
3. Find the origin and descending edge at low speed in the forward direction
4. Rear shutdown



Origin zeroing method26-b

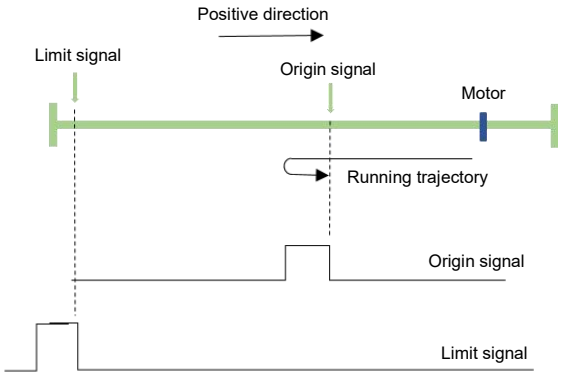
1. Starting Origin Regression
2. Origin OFF
3. Find the origin rising edge on the forward highway
4. Encountering the positive limit position
5. Reverse high-speed search for the origin rising edge
6. Slow down to
7. Find the origin and descending edge at low speed in the forward direction
8. Rear shutdown



Origin zeroing method26-c

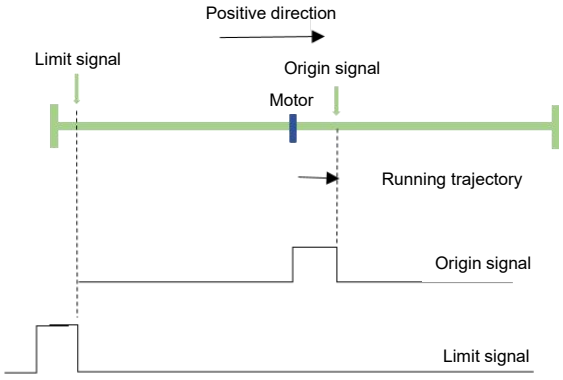
Origin zeroing method27（6098 00h =27）

1. Origin regression begins
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Slow down to
5. Find the origin and descending edge at low speed in the forward direction
6. Rear shutdown



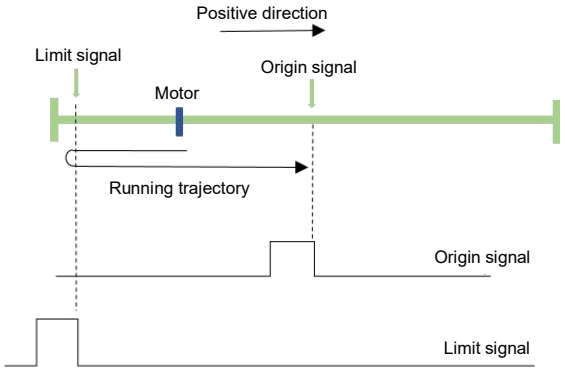
Origin zeroing method27-a

1. Origin regression begins
2. Origin signal ON
3. Find the origin and descending edge at low speed in the forward direction
4. Rear shutdown



Origin zeroing method27-b

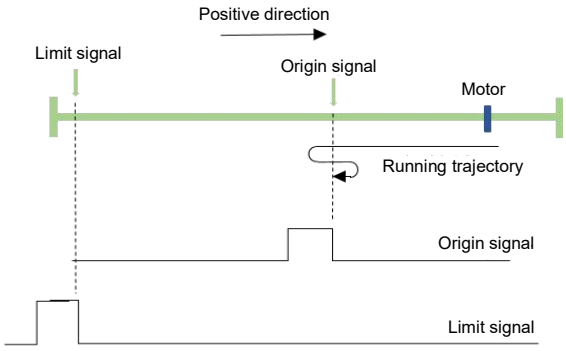
1. Origin regression begins
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Contact negative limit position
5. Find the origin rising edge on the forward highway
6. Find the origin and descending edge at low speed in the forward direction
7. Rear shutdown



Origin zeroing method27-c

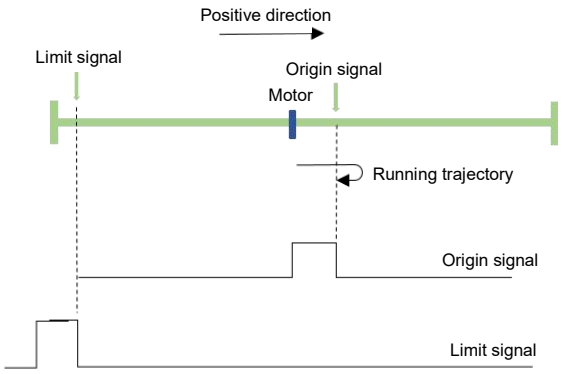
Origin zeroing method28（6098 00h =28）

1. Origin regression begins
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Slow down to
5. Find the origin and descending edge at low speed in the forward direction
6. Slow down to 0
7. Reverse low-speed search for the origin rising edge
8. Rear shutdown



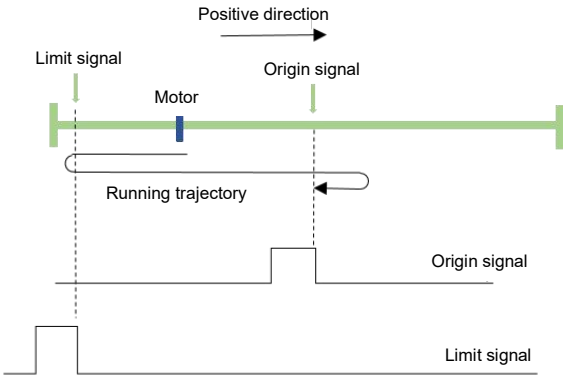
Origin zeroing method28-a

1. Origin regression begins
2. Origin signal ON
3. Find the origin and descending edge at low speed in the forward direction
4. Reverse low-speed search for the origin rising edge
5. Rear shutdown



Origin zeroing method28-b

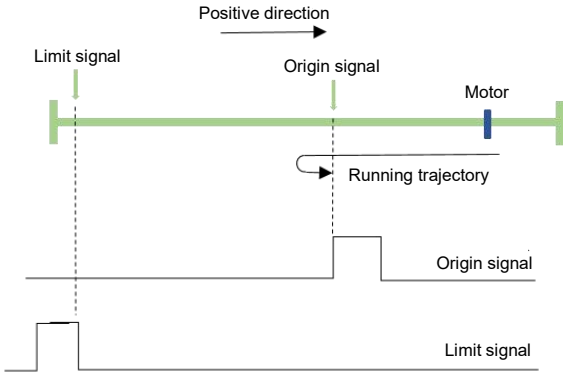
1. Origin regression begins
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Encountering negative limit position
5. Forward high-speed search for the origin signal falling edge
6. Slow down to 0
7. Reverse low-speed search for the origin rising edge
8. Rear shutdown



Origin zeroing method28-c

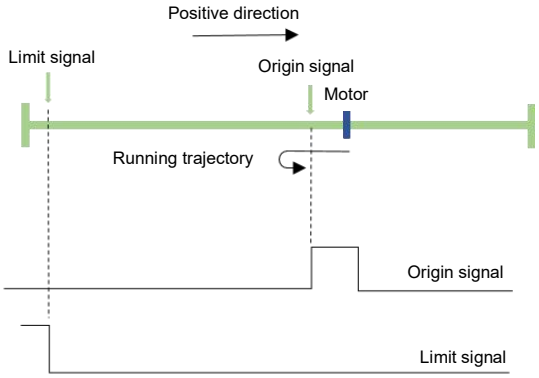
Origin zeroing method29（6098 00h =29）

1. Origin regression begins
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Reverse low-speed search for the origin and descent edge
5. Slow down to 0Find the origin rising edge at low speed in the forward direction
6. Rear shutdown



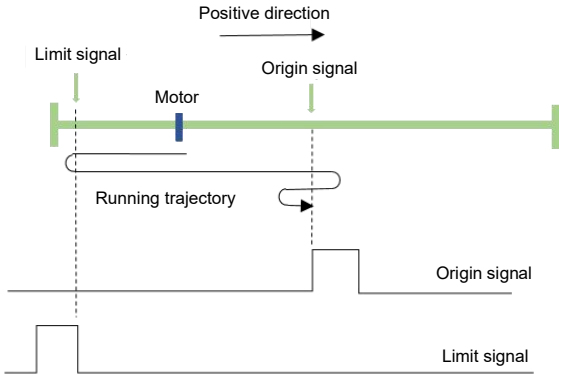
Origin zeroing method29-a

1. Origin regression begins
2. Origin signal ON
3. Reverse low-speed search for the origin and descent edge
4. Slow down to 0
5. Find the origin rising edge at low speed in the forward direction
6. Rear shutdown



Origin zeroing method29-b

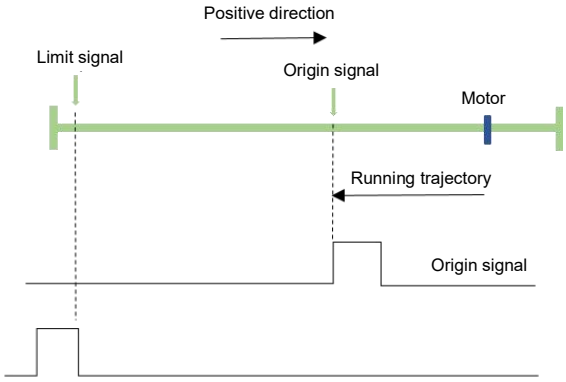
1. Origin regression begins
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Encountering negative limit position
5. Forward high-speed search for the rising edge of the origin signal
6. Slow down to 0
7. Reverse low-speed search for the origin signal falling edge
8. Forward low-speed origin signal rising edge
9. Rear shutdown



Origin zeroing method29-c

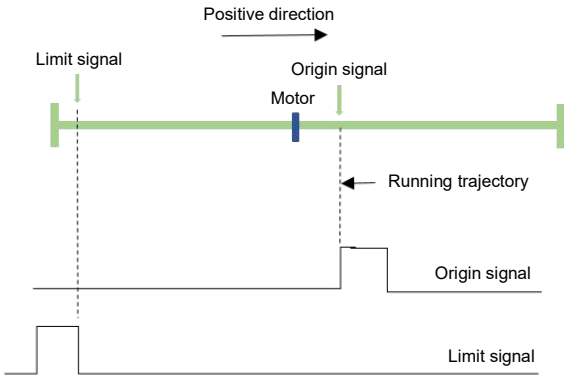
Origin zeroing method30（6098 00h =30）

1. Origin regression begins
2. Origin signal OFF
3. Reverse high-speed search for the origin rising edge
4. Reverse low-speed search for the origin and descent edge
5. Rear shutdown



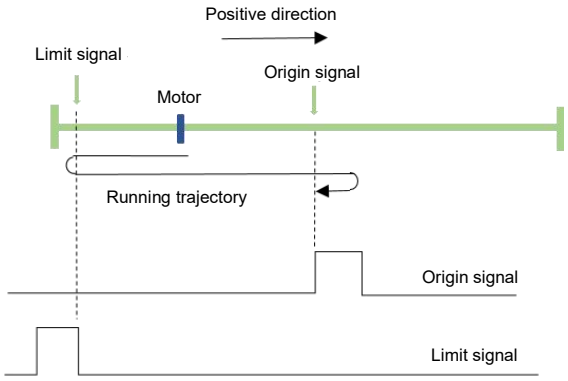
Origin zeroing method30-a

1. Origin regression begins
2. Origin signal ON
3. Reverse low-speed search for the origin and descent edge
4. Rear shutdown



Origin zeroing method30-b

1. Origin regression begins
2. Origin signal OFF
3. Reverse high-speed search for the origin and descent edge
4. Encountering negative limit position
5. Forward high-speed search for the rising edge of the origin signal
6. Slow down to 0
7. Reverse low-speed origin finding signal falling edge
8. Rear shutdown



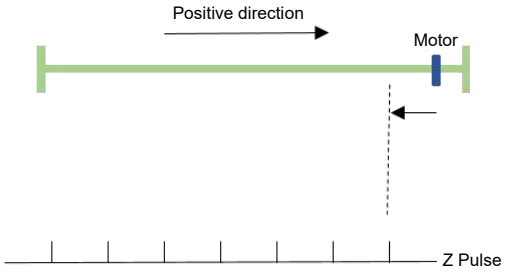
Origin zeroing method30-c

Origin zeroing method31（6098 00h =31）:reserve。

Origin zeroing method32（6098 00h =32）:reserve。

Origin zeroing method33（6098 00h =33）

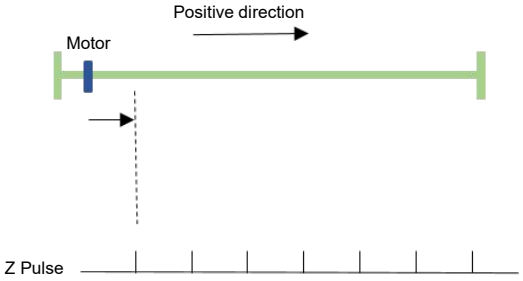
1. Origin zeroing begins→Find the first Z-pulse in the negative direction



Origin zeroing method33

Origin zeroing method34（6098 00h =34）

1. Origin zeroing begins→Forward looking for the first Z-pulse



Origin zeroing method34

Origin zeroing method35（6098 00h =35）

1. Set the current position to zero

9.5 Object Dictionary

9.5.1 Object Attribute Description

DEFINITION

Index ": specifies the position of each object in the object dictionary, as shown in a hexadecimal (h) table.

Sub Index ": The same Index contains multiple objects, and the bias of each object under that class.

Data type ": Please refer to Table 5-1 for details.

Table 6-1 Data type Describe **Data type**	**Numeric Range**	**Length**	**DS301 value**
Int8	-128 ~127	1byte	2
Uint8	0~255	1byte	5
Int16	-32768~+32767	2byte	3
Uint16	0~65535	2byte	6
Int32	-2147483648~+2147483647	4byte	4
Uint32	0~4294967295	4byte	7
String	ASCII	-	9

“Reading and writing type”:Please refer to Table 6-2。

Table 6-2 Reading and writing type Describe **Reading and writing type**	**Describe**
RW	Can read and write
WO	Only write
RO	read only
CONST	Constant, read-only

“Object structure”:Please refer to Table 6-3。

Table 6-3 Object structure Describe

Object structure	Describe
VAR	Single simple numerical value, including the data types in Table 3-1
ARR	Multiple data field objects, where variables in each field have the same data form
REC	Multiple data field objects, where variables in each field have different data forms

9.5.21000 h Group Object List

Index	Sub Index	Name	Access i-bility	PDO mapping	Data type	Unit	range	Factory value
1000h	00	drive type	RO	NO	UINT32	-	-	0x00020192
1001h	00	error register	RO	NO	UINT8	-	-	-
1008h	00	Drive Name	RO	NO	-	-	-	M820 EtherCAT CiA402 Motion Control
100Ah	00	Software version	RO	NO	-	-	-	5.11
1600h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	0x05
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x60400010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x607a0020
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0x60ff0020
	04	Mapping objects 4	RW	NO	UINT32		0~(232-1)	0x60600008
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0x00000008
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1601h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	5
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x60400010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x607a0020
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0x60ff0020
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0x60710010
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0x60720010
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1602h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	2
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x604000

								10
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x60ff0020
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1603h	00	Mapping objects number	RW	NO	UINT8	-	0~8	5
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x60400010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x607a0020
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0x60ff0020
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0x60710010
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0x60720010
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1610h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	0x05
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x68400010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x687a0020
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0x68ff0020
	04	Mapping objects 4	RW	NO	UINT32		0~(232-1)	0x68600008
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0x00000008
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1611h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	5
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x60400010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x607a00

								20
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0x68ff0020
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0x68710010
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0x68720010
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1612h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	2
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x68400010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x68ff0020
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1613h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	5
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x68400010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x687a0020
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0x68ff0020
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0x68710010
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0x68720010
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1A00h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	5
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x60410010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x60640020
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0x606C0

								020
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0x60610010
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0x00000008
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
1A01h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	6
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x60410010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x603f0010
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0x60640020
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0x60f40020
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0x606c0020
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0x60770010
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1A02h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	2
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x60410010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x60640020
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1A03h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	5
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x60410010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x60640020
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0x606c0020
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0x60610008

	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0x00000008
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1A10h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	5
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x68410010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x68640020
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0x686C0020
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0x68610010
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0x00000008
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1A11h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	6
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x68410010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x683f0010
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0x68640020
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0x68f40020
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0x686c0020
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0x68770010
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1A12h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	2
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x68410010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x68640020
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0

	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1A13h	00	Number of mapped objects	RW	NO	UINT8	-	0~8	5
	01	Mapping objects 1	RW	NO	UINT32	-	0~(232-1)	0x68410010
	02	Mapping objects 2	RW	NO	UINT32	-	0~(232-1)	0x68640020
	03	Mapping objects 3	RW	NO	UINT32	-	0~(232-1)	0x686c0020
	04	Mapping objects 4	RW	NO	UINT32	-	0~(232-1)	0x68610008
	05	Mapping objects 5	RW	NO	UINT32	-	0~(232-1)	0x00000008
	06	Mapping objects 6	RW	NO	UINT32	-	0~(232-1)	0
	07	Mapping objects 7	RW	NO	UINT32	-	0~(232-1)	0
	08	Mapping objects 8	RW	NO	UINT32	-	0~(232-1)	0
	09	Mapping objects 9	RW	NO	UINT32	-	0~(232-1)	0
	10	Mapping objects 10	RW	NO	UINT32	-	0~(232-1)	0
1C00h	00	Number of Sub Index	RO	NO	UINT8	-	-	4
	01	SM0 type	RO	NO	UINT8	-	-	1
	02	SM1 type	RO	NO	UINT8	-	-	2
	03	SM2 type	RO	NO	UINT8	-	-	3
	04	SM3 type	RO	NO	UINT8	-	-	4
1C12h	00	RPDO allocation Number of Sub Index	RW	NO	UINT8	-	0~1	2
	01	RPDO allocation object index	RW	YES	UINT16	-	0~65535	0x1601
	02	RPDO allocation object index	RW	YES	UINT16	-	0~65535	0x1611
1C13h	00	TPDO Allocation Number of Sub Index	RW	NO	UINT8	-	0~1	2
	01	Index of objects allocated by TPDO	RW	YES	UINT16	-	0~65535	0x1A01
	02	Index of objects allocated by TPDO	RW	YES	UINT16	-	0~65535	0x1A11
1C32h	00	Synchronize the number of output indices	RO	NO	UINT8	-	-	32
	01	Synchronization type	RW	NO	UINT16	-	-	0
	02	Cycle time	RO	NO	UINT32	ns	-	0
	04	Supported Synchronization Types	RO	NO	UINT16	-	-	0x401F
	05	Minimum period	RO	NO	UINT32	ns	-	250000
	06	Calculation and replication	RO	NO	UINT32	ns	-	0

		time						
	08	Obtain Cycle Time	RW	NO	UINT16	-	-	0
	09	delay time	RO	NO	UINT32	ns	-	0
	0A	SYN 0 time	RW	NO	UINT32	ns	-	-
	0B	Number of losses	RO	NO	UINT16	-	-	0
	0C	Cycle exceeds count	RO	NO	UINT16	-	-	0
	20	Synchronization error	RO	NO	BOOL	-	-	0
1C33h	00	Number of synchronized input indices	RO	NO	UINT8	-	-	32
	01	Synchronization type	RW	NO	UINT16	-	-	0
	02	Cycle time	RO	NO	UINT32	ns	-	0
	04	Supported Synchronization Types	RO	NO	UINT16	-	-	0x401F
	05	Minimum period	RO	NO	UINT32	ns	-	250000
	06	Calculation and replication time	RO	NO	UINT32	ns	-	0
	08	Obtain Cycle Time	RW	NO	UINT16	-	-	0
	09	delay time	RO	NO	UINT32	ns	-	0
	0A	SYN 0 time	RW	NO	UINT32	ns	-	-
	0B	Number of losses	RO	NO	UINT16	-	-	0
	0C	Cycle exceeds count	RO	NO	UINT16	-	-	0
	20	Synchronization error	RO	NO	BOOL	-	-	0

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Index	Sub Index	Name	Acces-sibility	PDO mapping	Data type	Unit	range	Factory value
603Fh	00	Error code	RO	TPDO	UINT16	-	0~65535	0
6040h	00	Control word	RW	RPDO	UINT16	-	0~65535	0
6041h	00	State word	RO	TPDO	UINT16	-	0~65535	0
6060h	00	Control Modes	RO	RPDO	INT8	-	0~10	8
6061h	00	Mode display	RO	TPDO	INT8	-	0~10	-
6062h	00	Position instruction	RO	TPDO	INT32	Instruction unit/s	-	-
6063h	00	Position feedback	RO	TPDO	INT32	Coder unit	-	-
6064h	00	Position feedback	RO	TPDO	INT32	Instruction unit/s	-	-
6065h	00	Threshold for excessive positional deviation	RW	RPDO	UINT32	Instruction unit/s	-	83886080
6067h	00	Position has reached the threshold	RW	RPDO	UINT32	Instruction unit/s	0~(232-1)	100
6068h	00	Position reaches the window time	RW	RPDO	UINT16	1ms	0~60000	0
606Bh	00	Actual speed instruction	RO	TPDO	UINT32	rpm	-	-
606Ch	00	Actual Speed	RO	TPDO	INT32	0.1 rpm	-	-

606Dh	00	Speed reaches threshold	RW	RPDO	UINT16	0.1 rpm	0~60000	100
606Eh	00	Time to reach the speed window	RW	RPDO	UINT16	ms	0~65535	0
606Fh	00	0 speed threshold	RW	RPDO	UINT16	rpm	0~65535	10
6071h	00	Target torque	RW	RPDO	INT16	0.1%	-3000~3000	0
6072h	00	Maximum torque	RW	RPDO	INT16	0.1%	-3000~3000	0
6074h	00	Torque Instruction	RO	TPDO	INT16	0.1%	-3000~3000	0
6075h	00	Rated current of motor	RO	TPDO	UINT32	0.01 A	0~(232-1)	-
6076h	00	Rated torque of motor	RO	TPDO	UINT32	0.01 Nm	0~(232-1)	-
6077h	00	Actual torque	RO	TPDO	UINT16	0.1%	-3000~3000	0
6078h	00	Actual current	RO	TPDO	UINT16	0.1%	-3000~3000	0
607Ah	00	Target Position Setting	RW	RPDO	INT32	Instruction unit/s	-231~(231-1)	0
607Ch	00	Origin Offset	RW	RPDO	INT32	Coder unit	-231~(231-1)	0
607Dh	00	Number of Sub Index	RO	NO	UINT8	-	-	2
	01	Minimum Position Limit	RW	RPDO	INT32	Instruction unit/s	-231~(231-1)	-231
	02	Maximum Position Limit	RW	RPDO	INT32	Instruction unit/s	-231~(231-1)	231-1
607Eh	00	Instruction polarity	RW	RPDO	UINT8	-	0~255	0
607Fh	00	Maximum Contour Speed	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	50000
6080h	00	Maximum motor speed	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	60000
6081h	00	Profile velocity	RW	RPDO	UINT32	Instruction unit/s	0~(232-1)	10000000
6083h	00	Contour Acceleration	RW	RPDO	UINT32	ms	0~(232-1)	200
6084h	00	Contour Deceleration	RW	RPDO	UINT32	ms	0~(232-1)	200
6085h	00	Fast stop reduction	RW	RPDO	UINT32	ms	0~(232-1)	200
6086h	00	Selection of operating curve	RW	RPDO	INT16	-	-215~(215-1)	0
6087h	00	Torque ramp time	RW	RPDO	UINT32	ms	0~(232-1)	0
6091h	00	Number of Sub Index	RO	NO	UINT8	-	-	2
	01	Motor resolution	RW	RPDO	UINT32	-	1~(232-1)	1
	02	Load Axis Resolution	RW	RPDO	UINT32	-	1~(232-1)	1
6098h	00	Origin regression method	RW	RPDO	INT8	-	1~35	1
6099h	00	Number of Sub Index	RO	NO	UINT8	-	-	2
	01	High speed search for deceleration points	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	1000
	02	Low speed search for origin	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	300
609Ah	00	zeroingAcceleration	RW	RPDO	UINT32	ms	0~(232-1)	50
60B0h	00	Position offset	RW	RPDO	INT32	Instruction unit/s	-231~(231-1)	0
60B1h	00	Speed offset	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	0
60B2h	00	Torque offset	RO	TPDO	UINT16	0.1%	-3000~3000	0
60B8h	00	Probe mode	RW	RPDO	UINT16	-	0~65535	0

60B9h	00	Probe State	RO	TPDO	UINT16	-	0~65535	0
60BAh	00	Probe 1 rising edge position	RO	TPDO	INT32	Instruction unit/s	-231~ (231-1)	0
60BBh	00	Probe 1 descending edge position	RO	TPDO	INT32	Instruction unit/s	-231~ (231-1)	0
60BCh	00	Probe 1 rising edge position	RO	TPDO	INT32	Instruction unit/s	-231~ (231-1)	0
60BDh	00	Probe 1 descending edge position	RO	TPDO	INT32	Instruction unit/s	-231~ (231-1)	0
60E0h	00	Positive torque limit	RW	RPDO	UINT16	0.1%	0~3000	3000
60C5h	00	Maximum Acceleration	RW	RPDO	UINT32	ms	0~(232-1)	0
60C6h	00	Maximum Deceleration	RW	RPDO	UINT32	ms	0~(232-1)	0
60E1h	00	Reverse torque limit	RW	RPDO	UINT16	0.1%	0~3000	3000
60F4h	00	Positional deviation	RO	TPDO	INT32	Instruction unit/s	-	-
60FDh	00	DI State	RO	TPDO	UNT32	-	-	-
60FEh	00	Sub Index Number	RO	NO	UINT8	-	-	2
	01	Physical output	RO	TPDO	UINT32	-	0~(232-1)	0
	02	Physical output	RO	TPDO	UINT32	-	0~(232-1)	0
60FFh	00	Target speed	RW	RPDO	INT32	0.1 rpm	-	-
6502h	00	Supported Drive Modes	RO	NO	UINT32	-	-	0x3AD

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Index	Sub Index	Name	Acces-sibility	PDO mapping	Data type	Unit	range	Factory value
683Fh	00	Error code	RO	TPDO	UINT16	-	0~65535	0
6840h	00	Control word	RW	RPDO	UINT16	-	0~65535	0
6841h	00	State word	RO	TPDO	UINT16	-	0~65535	0
6860h	00	Control Modes	RO	RPDO	INT8	-	0~10	8
6861h	00	Mode display	RO	TPDO	INT8	-	0~10	-
6862h	00	Position instruction	RO	TPDO	INT32	Instruction unit/s	-	-
6863h	00	Position feedback	RO	TPDO	INT32	Coder unit	-	-
6864h	00	Position feedback	RO	TPDO	INT32	Instruction unit/s	-	-
6865h	00	Position deviation too large threshold	RW	RPDO	UINT32	Instruction unit/s	-	83886080
6867h	00	Position has reached the threshold	RW	RPDO	UINT32	Instruction unit/s	0~(232-1)	100
6868h	00	Position reaches the window time	RW	RPDO	UINT16	1ms	0~60000	0
606Bh	00	Actual speed instruction	RO	TPDO	UINT32	rpm	-	-
686Ch	00	Actual Speed	RO	TPDO	INT32	0.1 rpm	-	-
686Dh	00	Speed reaches threshold	RW	RPDO	UINT16	0.1 rpm	0~60000	100
686Eh	00	Time to reach the speed window	RW	RPDO	UINT16	ms	0~65535	0

686Fh	00	0 speed threshold	RW	RPDO	UINT16	rpm	0~65535	10
6871h	00	Target torque	RW	RPDO	INT16	0.1%	-3000~3000	0
6872h	00	Maximum torque	RW	RPDO	INT16	0.1%	-3000~3000	0
6874h	00	Torque Instruction	RO	TPDO	INT16	0.1%	-3000~3000	0
6875h	00	Rated current of motor	RO	TPDO	UINT32	0.01 A	0~(232-1)	-
6876h	00	Rated torque of motor	RO	TPDO	UINT32	0.01 Nm	0~(232-1)	-
6877h	00	Actual torque	RO	TPDO	UINT16	0.1%	-3000~3000	0
6878h	00	Actual current	RO	TPDO	UINT16	0.1%	-3000~3000	0
687Ah	00	Target Position Setting	RW	RPDO	INT32	Instruction unit/s	-231~ (231-1)	0
687Ch	00	Origin Offset	RW	RPDO	INT32	Coder unit	-231~(231-1)	0
687Dh	00	Number of Sub Index	RO	NO	UINT8	-	-	2
	01	Minimum Position Limit	RW	RPDO	INT32	Instruction unit/s	-231~(231-1)	-231
	02	Maximum Position Limit	RW	RPDO	INT32	Instruction unit/s	-231~(231-1)	231-1
687Eh	00	Instruction polarity	RW	RPDO	UINT8	-	0~255	0
687Fh	00	Maximum Contour Speed	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	50000
6880h	00	Maximum motor speed	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	60000
6881h	00	Profile velocity	RW	RPDO	UINT32	Instruction unit/s /s	0~(232-1)	10000000
6883h	00	Contour Acceleration	RW	RPDO	UINT32	ms	0~(232-1)	200
6884h	00	Contour Deceleration	RW	RPDO	UINT32	ms	0~(232-1)	200
6085h	00	Fast stopDeceleration	RW	RPDO	UINT32	ms	0~(232-1)	200
6886h	00	Selection of operating curve	RW	RPDO	INT16	-	-215~ (215-1)	0
6887h	00	Torque ramp time	RW	RPDO	UINT32	ms	0~(232-1)	0
6891h	00	Number of Sub Index	RO	NO	UINT8	-	-	2
	01	Motor resolution	RW	RPDO	UINT32	-	1~(232-1)	1
	02	Load Axis Resolution	RW	RPDO	UINT32	-	1~(232-1)	1
6898h	00	Origin regression method	RW	RPDO	INT8	-	1~35	1
6899h	00	Number of Sub Index	RO	NO	UINT8	-	-	2
	01	High speed search for deceleration points	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	1000
	02	Low speed search for origin	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	300
689Ah	00	zeroingAcceleration	RW	RPDO	UINT32	ms	0~(232-1)	50
68B0h	00	Position offset	RW	RPDO	INT32	Instruction unit/s	-231~(231-1)	0
68B1h	00	Speed offset	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	1000
68B2h	00	Actual torque	RO	TPDO	UINT16	0.1%	-3000~3000	0
68B8h	00	Probe mode	RW	RPDO	UINT16	-	0~65535	0
68B9h	00	Probe State	RO	TPDO	UINT16	-	0~65535	0
68BAh	00	Probe 1 rising edge position	RO	TPDO	INT32	Instruction unit/s	-231~ (231-1)	0

68BBh	00	Probe 1 descending edge position	RO	TPDO	INT32	Instruction unit/s	-231~ (231-1)	0
68BCh	00	Probe 1 rising edge position	RO	TPDO	INT32	Instruction unit/s	-231~ (231-1)	0
68BDh	00	Probe 1 descending edge position	RO	TPDO	INT32	Instruction unit/s	-231~ (231-1)	0
68C5h	00	Maximum Acceleration	RW	RPDO	UINT32	ms	0~(232-1)	0
68C6h	00	Maximum Deceleration	RW	RPDO	UINT32	ms	0~(232-1)	0
68E0h	00	Positive torque limit	RW	RPDO	UINT16	0.1%	0~3000	3000
68E1h	00	Reverse torque limit	RW	RPDO	UINT16	0.1%	0~3000	3000
68F4h	00	Positional deviation	RO	TPDO	INT32	Instruction unit/s	-	-
68FDh	00	DI State	RO	TPDO	UNT32	-	-	-
68FEh	00	Sub Index Number	RO	NO	UINT8	-	-	2
	01	Physical output	RO	TPDO	UINT32	-	0~(232-1)	0
	02	Physical output	RO	TPDO	UINT32	-	0~(232-1)	0
68FFh	00	Target speed	RW	RPDO	INT32	0.1 rpm	-	-
6D02h	00	Supported Drive Modes	RO	NO	UINT32	-	-	0x3AD

9.5.57000 h Group Object List

Index	Sub Index	Name	Acces-sibility	PDO mapping	Data type	Unit	range	Factory value
703Fh	00	Error code	RO	TPDO	UINT16	-	0~65535	0
7040h	00	Control word	RW	RPDO	UINT16	-	0~65535	0
7041h	00	State word	RO	TPDO	UINT16	-	0~65535	0
7060h	00	Control Modes	RO	RPDO	INT8	-	0~10	8
7061h	00	Mode display	RO	TPDO	INT8	-	0~10	-
7062h	00	Position instruction	RO	TPDO	INT32	Instruction unit/s	-	-
7063h	00	Position feedback	RO	TPDO	INT32	Coder unit	-	-
7064h	00	Position feedback	RO	TPDO	INT32	Instruction unit/s	-	-
7065h	00	Threshold for excessive positional deviation	RW	RPDO	UINT32	Instruction unit/s	-	83886080
7067h	00	Position has reached the threshold	RW	RPDO	UINT32	Instruction unit/s	0~(232-1)	100
7068h	00	Position reaches the window time	RW	RPDO	UINT16	1ms	0~60000	0
706Bh	00	Actual speed instruction	RO	TPDO	UINT32	rpm	-	-
706Ch	00	Actual Speed	RO	TPDO	INT32	0.1 rpm	-	-
706Dh	00	Speed reaches threshold	RW	RPDO	UINT16	0.1 rpm	0~60000	100
706Eh	00	Time to reach the speed window	RW	RPDO	UINT16	ms	0~65535	0
706Fh	00	0 speed threshold	RW	RPDO	UINT16	rpm	0~65535	10
7071h	00	Target torque	RW	RPDO	INT16	0.1%	-3000~3000	0

7072h	00	Maximum torque	RW	RPDO	INT16	0.1%	-3000~3000	0
7074h	00	Torque Instruction	RO	TPDO	INT16	0.1%	-3000~3000	0
7075h	00	Rated current of motor	RO	TPDO	UINT32	0.01 A	0~(232-1)	-
7076h	00	Rated torque of motor	RO	TPDO	UINT32	0.01 Nm	0~(232-1)	-
7077h	00	Actual torque	RO	TPDO	UINT16	0.1%	-3000~3000	0
7078h	00	Actual current	RO	TPDO	UINT16	0.1%	-3000~3000	0
707Ah	00	Target Position Setting	RW	RPDO	INT32	Instruction unit/s	-231~(231-1)	0
707Ch	00	Origin Offset	RW	RPDO	INT32	Coder unit	-231~(231-1)	0
707Dh	00	Number of Sub Index	RO	NO	UINT8	-	-	2
	01	Minimum Position Limit	RW	RPDO	INT32	Instruction unit/s	-231~(231-1)	-231
	02	Maximum Position Limit	RW	RPDO	INT32	Instruction unit/s	-231~(231-1)	231-1
707Eh	00	Instruction polarity	RW	RPDO	UINT8	-	0~255	0
707Fh	00	Maximum Contour Speed	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	50000
7080h	00	Maximum motor speed	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	60000
7081h	00	Profile velocity	RW	RPDO	UINT32	Instruction unit/s /s	0~(232-1)	10000000
7083h	00	Contour Acceleration	RW	RPDO	UINT32	ms	0~(232-1)	200
7084h	00	Contour Deceleration	RW	RPDO	UINT32	ms	0~(232-1)	200
7085h	00	Fast stopDeceleration	RW	RPDO	UINT32	ms	0~(232-1)	200
7086h	00	Selection of operating curve	RW	RPDO	INT16	-	-215~(215-1)	0
7087h	00	Torque ramp time	RW	RPDO	UINT32	ms	0~(232-1)	0
7091h	00	Number of Sub Index	RO	NO	UINT8	-	-	2
	01	Motor resolution	RW	RPDO	UINT32	-	1~(232-1)	1
	02	Load Axis Resolution	RW	RPDO	UINT32	-	1~(232-1)	1
7098h	00	Origin regression method	RW	RPDO	INT8	-	1~35	1
7099h	00	Number of Sub Index	RO	NO	UINT8	-	-	2
	01	High speed search for deceleration points	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	1000
	02	Low speed search 原点	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	300
709Ah	00	zeroingAcceleration	RW	RPDO	UINT32	ms	0~(232-1)	50
70B0h	00	Position offset	RW	RPDO	INT32	Instruction unit/s	-231~(231-1)	0
70B1h	00	Speed offset	RW	RPDO	UINT32	0.1 rpm	0~(232-1)	1000
70B2h	00	Actual torque	RO	TPDO	UINT16	0.1%	-3000~3000	0
70B8h	00	Probe mode	RW	RPDO	UINT16	-	0~65535	0
70B9h	00	Probe State	RO	TPDO	UINT16	-	0~65535	0
70BAh	00	Probe 1 rising edge position	RO	TPDO	INT32	Instruction unit/s	-231~ (231-1)	0
70BBh	00	Probe 1 descending edge position	RO	TPDO	INT32	Instruction unit/s	-231~ (231-1)	0
70BCh	00	Probe 1 rising edge	RO	TPDO	INT32	Instruction	-231~	0

		position				unit/s	(231-1)	
70BDh	00	Probe 1 descending edge position	RO	TPDO	INT32	Instruction unit/s	-231~ (231-1)	0
70E0h	00	Maximum Acceleration	RW	RPDO	UINT32	ms	0~(232-1)	0
70C5h	00	Maximum Deceleration	RW	RPDO	UINT32	ms	0~(232-1)	0
70C6h	00	Positive torque limit	RW	RPDO	UINT16	0.1%	0~3000	3000
70E1h	00	Reverse torque limit	RW	RPDO	UINT16	0.1%	0~3000	3000
70F4h	00	Positional deviation	RO	TPDO	INT32	Instruction unit/s	-	-
70FDh	00	DI State	RO	TPDO	UNT32	-	-	-
70FEh	00	Sub Index Number	RO	NO	UINT8	-	-	2
	01	Physical output	RO	TPDO	UINT32	-	0~(232-1)	0
	02	Physical output	RO	TPDO	UINT32	-	0~(232-1)	0
70FFh	00	Target speed	RW	RPDO	INT32	0.1 rpm	-	-
7502h	00	Supported Drive Modes	RO	NO	UINT32	-	-	0x3AD

9.5.6 Detailed Object Dictionary Description

9.5.6.11000 h group object details Describe

Object 1000h:Equipment type(Device Type)					
Index	1000h				
Name	Equipment type				
Object structure	VAR	**Data type**	Uint32	**Data range**	**-**
Can you map it	NO	**Accessibility**	RO	**Factory value**	0x05500410

DescribeCoEEquipment type:

BIT	Name	Describe
0~15	device profile	402(0x192):device profile
16~23	type	02:Servo drive
25~31	mode	Manufacturer customization

Object 1001h:error register(Error Register)					
Index	1001h				
Name	error register				
Object structure	VAR	**Data type**	Uint8	**Data range**	**-**
Can you map it	NO	**Accessibility**	RO	**Factory value**	0

Include error information by Position

BIT	meaning	BIT	meaning
0	convention	4	communication
1	electric current	5	sub-protocol
2	voltage	6	reserve
3	temperature	7	Manufacturer Definition

Object 1008h:Manufacturer's Equipment(Manufacturer Device Name)					
Index	1008h				
Name	Manufacturer's Equipment				
Object structure	-	**Data type**	Uint8	**Data range**	**-**
Can you map it	NO	**Accessibility**	RO	**factory setting**	M820 EtherCAT CiA402 Motion Control
Describe Manufacturer's Equipment					

Object 100Ah:Software version(Software Version)					
Index	100Ah				
Name	Software version				
Object structure	-	**Data type**	-	**Data range**	**-**
Can you map it	NO	**Accessibility**	RO	**Factory value**	5.11
Describe software version number					

Object 1C00h:Synchronization management type(Sync manager type)					
Index	1C00h				
Name	Synchronization management type				
Object structure	REC	**Data type**	-	**Data range**	**-**
Can you map it	NO	**Accessibility**	RO	**Factory value**	-

Sub Index	00h				
Name	Synchronize Management Number of Sub Index Number				
Object structure	-	**Data type**	Uint8	**Data range**	-
Can you map it	NO	**Accessibility**	RO	**factory setting**	4

Sub Index	01h				
Name	Communication Type SM0				
Object structure	-	**Data type**	Uint8	**Data range**	-
Can you map it	NO	**Accessibility**	RO	**factory setting**	1
SM0 communication type: receiving email					

Sub Index	02h				
Name	SM1 communication type(Communication Type SM1)				
Object structure	-	**Data type**	Uint8	**Data range**	-
Can you map it	NO	**Accessibility**	RO	**factory setting**	2
SM1 communication type:Send email					
Sub Index	03h				
Name	SM2 communication type(Communication Type SM2)				
Object structure	-	**Data type**	Uint8	**Data range**	-
Can you map it	NO	**Accessibility**	RO	**factory setting**	3

SM2 communication type: process data output

Sub Index	04h				
Name	SM3 communication type(Communication Type SM3)				
Object structure	-	**Data type**	Uint8	**Data range**	-
Can you map it	NO	**Accessibility**	RO	**factory setting**	4
SM3 communication type: process data output					

Object 1C12h:Synchronization Management 2_RPDO allocation(Sync Manager 2 RPDO Assignment)					
Index	1C12h				
Name	Synchronization Management 2_RPDO allocation				
Object structure	ARR	**Data type**	Uint16	**Data range**	**-**
Can you map it	NO	**Accessibility**	RW	**Factory value**	-
Set the object index for RPDO allocation					

Sub Index	00h				
Name	Synchronization Management 2-RPDO Allocation Number of Sub Index Number				
Object structure	-	**Data type**	Uint8	**Data range**	-
Can you map it	NO	**Accessibility**	RW	**factory setting**	2

Sub Index	01h				
Name	Object Index of RPDO Allocation				
Object structure	-	**Data type**	Uint16	**Data range**	-
Can you map it	NO	**Accessibility**	RW	**factory setting**	0x1601

Sub Index	02h				
Name	Object Index of RPDO Allocation				
Object structure	-	**Data type**	Uint16	**Data range**	-
Can you map it	NO	**Accessibility**	RW	**factory setting**	0x1611
Set RPDO allocation index: 1. Configuration can only be done under the pre run state 2. Only 0x1603 0x1613 can customize Configuration, while others are built-in configurations 3. If using TwinCAT software to directly select RPDO allocation, otherwise: a. 1C12-00h Write value 0 b. 1C12-01h Write pre used RPDOx (1600h~1603h), Configuring RPDOx Mapping objects (e.g. 1600h) c. 1C12-02h Write pre used RPDOx (1610h~1613h), Configuration RPDOx Mapping objects (such as 1610h) d. 1C12-00h Write Value 2					

Object 1C13h:Synchronization Management 2 TPDO Assignment					
Index	1C13h				
Name	Synchronization Management 2-TPDO Allocation				
Object structure	ARR	**Data type**	Uint16	**Data range**	**-**
Can you map it	NO	**Accessibility**	RW	**Factory value**	-
Set the object index for TPDO allocation					

Sub Index	00h				
Name	Synchronization Management 2: Number of Sub Index assigned by TPDO				
Object structure	-	**Data type**	Uint8	**Data range**	-
Can you map it	NO	**Accessibility**	RW	**factory setting**	2

Sub Index	01h				
Name	Object Index of TPDO Assignment				
Object structure	-	**Data type**	Uint16	**Data range**	-
Can you map it	NO	**Accessibility**	RW	**factory setting**	0x1A01

Sub Index	02h				
Name	Object Index of TPDO Assignment				
Object structure	-	**Data type**	Uint16	**Data range**	-
Can you map it	NO	**Accessibility**	RW	**factory setting**	0x1A11

Set TPDO allocation index:

1. Configuration can only be done under the pre run state

2. Only 0x1A03 and 0x1A13 can customize Configuration, while others are built-in configurations

If TwinCAT software is used to directly select the allocation of TPDO, otherwise:

a. 1C13-00h Write value 0

b. 1C13-01h Write pre used TPDOx (1A00h~1A03h), Configuration TPDOx Mapping objects (such as 1A00h)

b. 1C13-02h Write pre used TPDOx (1A10h~1A13h), Configuration TPDOx Mapping objects (such as 1A10h)

c. 1C13-00h Write Value 2

9.5.6.26000 h group object detailed description

Object 603Fh:Fault code(Error Code)					
Index	603Fh				
Name	Fault code				
Object structure	VAR	**Data type**	Uint16	**Data range**	0~65535
Can you map it	NO	**Accessibility**	RO	**Factory value**	-
Fault code: The last error that occurred in the drive. Please refer to the Er fault alarm group for details.					

Object 6040h:Control word (Control Word)					
Index	6040h				
Name	Control word				
Object structure	VAR	**Data type**	Uint16	**Data range**	0~65535
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	0

Definition of Control Word Position:

Position	meaning	Describe
0	Servo ready	0- Invalid；1- Effective
1	Connect the main circuit power	0- Invalid；1- Effective
2	Fast stop	0-Effective；1-Invalid
3	Servo operation	0- Invalid；1- Effective
4~6	Related to mode	-
7	Fault Position	Bit7 Rising Edge Effective Bit7 remains at 1, all other control instructions are invalid
8	Pause	
9~10	NA	Reserve
11~15	Manufacturer customization	Reserve

Definition of Position4~6:

Position	MODE			
	Contour Position Setting	Profile velocity	Profile torque	Homing Mode
4	New Position Set Rising Edge Trigger	reserve	reserve	Zeroing enabled
5	0: Non Immediate Updating 1:Immediate Updating	reserve	reserve	reserve
6	0: Non Immediate Updating 1: Relative Position Setting	reserve	reserve	reserve

Object 6041h:State word(Status Word)					
Index	6041h				
Name	State word				
Object structure	VAR	**Data type**	Uint16	**Data range**	0~65535

Can you map it	RPDO	Accessibility	RW	Factory value	0

Reflecting servo state:

Position	Name	Position Definition
0	Servo without malfunction	1-Effective；0-Invalid
1	Waiting for servo enable to be turned on	1-Effective；0-Invalid
2	Servo operation	1-Effective；0-Invalid
3	Malfunction	0: No malfunction 1: There is a malfunction
4	Connect the main circuit power	1-Effective；0-Invalid
5	Fast stop	0-Effective；1-Invalid
6	Servo cannot operate	1-Effective；0-Invalid
7	warn	Reserve, undefined
8	Manufacturer customization	
9	Remote control	0-Non CANopen mode. 1-CANopen remote control model.
10	Target achieved	0-Target Position Setting or speed not reached. 1-Target Position Setting or Speed Arrival.
11	The internal position of the software exceeds the limit	0-Position instruction or feedback has not reached the internal position limit of the software. 1- Position instruction or feedback reaches the internal position limit of the software
12	Zero speed signal	Speed mode: 0-non-zero speed 1-Zero speed Position setting mode: 0- Position setting completed 1-Position not completed
13		Origin zeroing failure flag: 0: zeroing No error occurred 1: Zeroing error occurred (zeroing mode, zeroing timeout)
14	NA	Reserve
15	homing completed	0-Origin zeroing has not been performed or completed. 1- The origin zeroing has been completed, and the reference point has been found.

Object 6060h:Mode selection(Modes of Operation)

Index	6060h				
Name	Mode selection				
Object structure	VAR	Data type	Int8	Data range	0~10
Can you map it	RPDO	Accessibility	RW	Factory value	8

Select Servo operation mode:

Set value	Describe
0	NA
1	Profile Position Mode (PP)
2	NA
3	Profile Velocity Mode(pv)
4	Profile Torque Mode(pt)
5	NA
6	Homing Mode(hm)
7	NA
8	Cyclic Synchronous Position Mode(csp)
9	Cyclic Synchronous Velocity Mode (CSV)
10	Cyclic Synchronous Torque Mode (CST)

Object 6061h:Run Mode Display(Modes of Operation Display)					
Index	6061h				
Name	Run Mode Display				
Object structure	VAR	Data type	Int8	Data range	0~10
Can you map it	TPDO	Accessibility	RO	Factory value	0

Select Servo operation mode:

Set value	Describe
0	NA
1	Profile Position Mode (PP)
2	NA
3	Profile Velocity Mode(pv)
4	Profile Torque Mode(pt)
5	NA
6	Homing Mode(hm)
7	NA
8	Cyclic Synchronous Position Mode(csp)
9	Cyclic Synchronous Velocity Mode (CSV)
10	Cyclic Synchronous Torque Mode (CST)

Object 6062h:Position instruction(Position Demand Value)	
Index	6062h
Name	Position instruction

Object structure	VAR	**Data type**	Int32	**Data range**	-2^{31}~(2^{31}-1)
Can you map it	TPDO	**Accessibility**	RO	**Factory value**	-
Reflect real-time position instruction（unit:Instruction unit/s）					

Object 6063h:Motor Position Feedback(Position Actual Value)					
Index	6063h				
Name	Motor Position Feedback				
Object structure	VAR	**Data type**	Int32	**Data range**	-2^{31}~(2^{31}-1)
Can you map it	TPDO	**Accessibility**	RO	**Factory value**	-
Reflect real-time position feedback（unit: Coder unit）					

Object 6064h:Position feedback(Position Actual Value)					
Index	6064h				
Name	Position feedback				
Object structure	VAR	**Data type**	Int32	**Data range**	-2^{31}~(2^{31}-1)
Can you map it	TPDO	**Accessibility**	RO	**Factory value**	-
Reflect real-time position feedback（unit:Instruction unit/s）					

Object 6065h:Threshold for excessive positional deviation(Following error Window)					
Index	6065h				
Name	Threshold for excessive positional deviation				
Object structure	VAR	**Data type**	Int32	**Data range**	-2^{31}~(2^{31}-1)
Can you map it	TPDO	**Accessibility**	RW	**Factory value**	-
Set a threshold for excessive positional deviation (Instruction unit/s)。 When the difference between user position instruction 6062h and user position feedback 6064h exceeds ± 6065h, a fault of excessive position deviation occurs. When 6065h is set to (232-1), the servo does not monitor excessive position deviation					

Object 6067h:Position has reached the threshold(Position Window)					
Index	6067h				
Name	**Position has reached the threshold**				
Object structure	VAR	**Data type**	Uint32	**Data range**	0~(2^{32}-1)
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	-
Set the threshold reached for Position (unit: Instruction unit/s). When the difference between User Position Instruction 6062h and User Actual Position Feedback 6064h is within ± 6067h, and the time reaches 6068h, it is considered that the Position has been reached. In Profile Position Mode, bit10=1 for State word 6041h.					

Object 6068h:Motor position reaches the window time(Position Window Time)	
Index	6068h
Name	Motor position reaches the window time

Object structure	VAR	**Data type**	Uint16	**Data range**	0~65535
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	0
Set the time window (unit: 2ms) for determining the effective position. When the difference between User Position Instruction 6062h and User Actual Position Feedback 6064h is within ± 6067h, and the time reaches 6068h, it is considered that the Position has been reached. In Profile Position Mode, bit10=1 for State word 6041h.					

Object 606Bh:User Actual Speed Instruction(Velocity Demand Value)					
Index	6068h				
Name	User Actual speed instruction				
Object structure	VAR	**Data type**	Int32	**Data range**	-2^{31}~(2^{31}-1)
Can you map it	TPDO	**Accessibility**	RO	**Factory value**	0
Reflect the user's actual speed instruction (unit: 1rpm). In the Position class mode, the speed instruction corresponding to the output of the Position adjuster is reflected; In speed mode, the inputInstruction reflecting the speed regulator.					

Object 606Ch:User Actual Speed Feedback(Velocity Actual Value)					
Index	606Ch				
Name	User Actual Speed Feedback				
Object structure	VAR	**Data type**	Int32	**Data range**	-2^{31}~(2^{31}-1)
Can you map it	TPDO	**Accessibility**	RO	**Factory value**	0
Reflecting the User Actual Speed Feedback value（unit:0.1rpm）。					

Object 606Dh:Speed reaches threshold speed(Velocity Window)					
Index	606Dh				
Name	Speed reaches threshold speed				
Object structure	VAR	**Data type**	Uint16	**Data range**	0~3000
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	0
Set the threshold for reaching the speed (unit: 1rpm). When the difference between Target speed 60FFh and User Actual Speed 606Ch is within ± 606Dh and the time reaches 606Eh, it is considered that the speed has been reached. In Profile Velocity Mode, bit10=1 for State word 6041h. On the contrary, bit10 of State word6061h is 0.					

Object 606Eh:Speed arrival time window(Velocity Window Time)					
Index	606Eh				
Name	Speed arrival time window				
Object structure	VAR	**Data type**	Uint16	**Data range**	0~65535
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	0
Set the time window (unit: ms) for determining the effective speed. When the difference between Target speed 60FFh and User Actual Speed 606Ch is within ± 606Dh and the time reaches 606Eh, it is considered that the speed has been reached. In Profile Velocity Mode, bit10=1 for State word 6041h. On the contrary, bit10 of State word6061h is 0.					

Object 606Fh:Zero speed threshold (Velocity Threshold)					
Index	606Fh				
Name	Zero speed threshold				
Object structure	VAR	**Data type**	Uint16	**Data range**	0~65535
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	10
Set a threshold (unit: 1rpm) to determine if the user's speed is 0. The user speed feedback 606Ch is within ± 606Fh, and the Setvalue Table shows that the user speed is 0. At this time, bit12 of State word6041h is 1; If either of the two conditions is not met, it is considered that the user speed is not 0. In this case, bit12 of State word 6041h is 0.					

Object 6071h:Target torque(Target torque)					
Index	6071h				
Name	Target torque				
Object structure	VAR	**Data type**	Int16	**Data range**	**-3000~3000**
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	0
Only used for Profile Torque Mode, Torque Instruction target value (unit: 0.1%).					

Object 6072h:Maximum torque(Max torque)					
Index	6072h				
Name	**Maximum torque**				
Object structure	VAR	**Data type**	Int16	**Data range**	**-3000~3000**
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	0
Applicable to all modes, Torque Instruction target value (unit: 0.1%).					

Object 6074h:Torque Instruction(Torque Demand Value)					
Index	6074h				
Name	Torque Instruction				
Object structure	VAR	**Data type**	Int16	**Data range**	**-**
Can you map it	TPDO	**Accessibility**	RO	**Factory value**	-
Display the current Torque Instruction (unit: 0.1%).					

Object 6075h:Rated current of motor(Motor rated current)					
Index	6075h				
Name	Rated current of motor				
Object structure	VAR	**Data type**	Uint32	**Data range**	**-**
Can you map it	TPDO	**Accessibility**	RO	**Factory value**	-
The rated current on the motor nameplate (unit: 0.01A). All parameter values related to current are related to this parameter.					

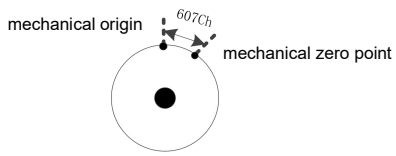
Object 6076h:Rated torque of motor(Motor rated torque)	
Index	6076h
Name	Rated torque of motor

Object structure	VAR	Data type	Uint32	Data range	0~(2^{32}-1)
Can you map it	TPDO	Accessibility	RO	Factory value	-
The rated torque on the motor nameplate (unit: 0.01Nm). All torque related parameter values are related to this parameter.					

Object 6077h:Motor feedback torque(Torque Actual Value)					
Index	6077h				
Name	Motor feedback torque				
Object structure	VAR	Data type	Int16	Data range	-
Can you map it	TPDO	Accessibility	RO	Factory value	-
Reflect the instantaneous torque output of the servo motor (unit: 1%).					

Object 6078h:Motor feedback current(Current Actual Value)					
Index	6078h				
Name	Motor feedback current				
Object structure	VAR	Data type	Int16	Data range	-
Can you map it	TPDO	Accessibility	RO	Factory value	-
Reflect the instantaneous current output size of the servo motor (unit: 1%).					

object607Ah:Target Position Setting(Target Position)					
Index	607Ah				
Name	Target Position Setting				
Object structure	VAR	Data type	Int32	Data range	-2^{31}~(2^{31}-1)
Can you map it	TPDO	Accessibility	RO	Factory value	-
Set the servo in Profile Position Mode and Periodic Synchronization Position Mode Target Position Setting （unit:Instruction unit/s）。					

Object 607Ch:Origin Offset(Hmoe Offset)					
Index	607Ch				
Name	Origin Offset				
Object structure	VAR	Data type	Int32	Data range	-2^{31}~(2^{31}-1)
Can you map it	RPDO	Accessibility	RW	Factory value	0
In the Position based Control Modes, the physical position (unit: Coder unit) where the mechanical zero deviates from the motor origin. Mechanical origin=Mechanical zero point+607Ch (Origin Offset). When set to 0, the origin is unbiased.  					

Object 607Dh:Absolute Position Limit for Software(Software position Limit)					
Index	607Dh				
Name	Absolute Position Limit for Software				
Object structure	VAR	**Data type**	Int32	**Data range**	-
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	-
Set the minimum and maximum values for Absolute Position Limit for Software. Minimum absolute position limit=(607D-01h) Maximum absolute position limit=(607D-02h)					

Sub Index	00h				
Name	Number of Sub Index with Absolute Position Limit				
Object structure	-	**Data type**	Uint8	**Data range**	-
Can you map it	NO	**Accessibility**	RO	**factory setting**	2

Sub Index	01h				
Name	Minimum Absolute Position Limit for Software (Min Position Limit)				
Object structure	-	**Data type**	Uint8	**Data range**	-2^{31}~(2^{31}-1)
Can you map it	RPDO	**Accessibility**	RW	**factory setting**	-2^{31}

Sub Index	02h				
Name	Maximum Absolute Position Limit for Software				
Object structure	-	**Data type**	Uint8	**Data range**	-2^{31}~(2^{31}-1)
Can you map it	RPDO	**Accessibility**	RW	**factory setting**	2^{31}-1

Object 607Eh:Instruction polarity(Polarity)					
Index	607Eh				
Name	Instruction polarity				
Object structure	VAR	**Data type**	Uint8	**Data range**	0-255
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	0

Reflect the polarity of the Position Instruction or Velocity Instruction.

Bit	7	6	5	4~0
meaning	Position Instruction polarity	Speed command polarity	Torque Instruction polarity	reserve

Bit7=1, Table shows standard Position mode. Set Position instruction × (-1) and reverse the motor direction. In Profile Position Mode and Periodic Synchronization Position Mode, invert the Position instruction and Target Position Setting.

Bit6=1, Table shows speed mode. Set the speed Instruction (60FFh) × (-1) and reverse the motor direction.

Object 607Fh:Maximum Contour Speed(Max Profile Velocity)					
Index	607Fh				
Name	Maximum Contour Speed				
Object structure	VAR	**Data type**	Uint32	**Data range**	0~(2^{32}-1)
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	50000

Maximum operating speed for users (unit: 0.1rpm). When there is a change in the speed instruction of the slave station, the Set value takes effect.

Object 6080h:Maximum motor speed(Max Motor Velocity)					
Index	6080h				
Name	Maximum motor speed				
Object structure	VAR	**Data type**	**Uint32**	**Data range**	0~(2^{32}-1)
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	6000
The maximum allowable operating speed of the motor can be obtained from the description manual of the servo motor (unit: 0.1rpm)					

Object 6081h:Profile velocity(Profile Velocity)					
Index	6081h				
Name	Profile velocity				
Object structure	VAR	**Data type**	**Uint32**	**Data range**	0~(2^{32}-1)
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	10000000
In Profile Position Mode, the operating speed of the uniform speed segment reached after completing the acceleration phase (unit: Instruction unit/s). $$\text{Motor speed} = \frac{6081\text{h} \times \frac{6091\text{h}-1}{6091\text{h}-2}}{\text{Encoder resolution}} \times 60$$					

Object 6083h:Contour Acceleration(Profile Acceleration)					
Index	6083h				
Name	Contour Acceleration				
Object structure	VAR	**Data type**	**Uint32**	**Data range**	0~(2^{32}-1)
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	200
The acceleration time (unit: ms) when the motor accelerates from 0rpm to 3000 rpm in contour mode. After receiving the Position Movement Instruction from the slave station, the Set value takes effect.					

Object 6084h:Contour Deceleration(Profile Deceleration)					
Index	6084h				
Name	Contour Deceleration				
Object structure	VAR	**Data type**	**Uint32**	**Data range**	0~(2^{32}-1)
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	200
The deceleration time (unit: ms) when the motor decelerates from 3000 rpm to 0rpm in Profile Velocity Mode. After receiving the Position Movement Instruction from the slave station, the Set value takes effect.					

Object 6085h:Fast stop Deceleration(Quick stop Declaration)					
Index	6085h				
Name	Fast stop Deceleration				
Object structure	VAR	**Data type**	**Uint32**	**Data range**	0~(2^{32}-1)
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	200

The deceleration time (unit: ms) when the motor decelerates from 3000 rpm to 0rpm. After receiving the Position Movement Instruction from the slave station, the Set value takes effect.

Object 6086h:Motor operating curve type (Motion Profile Type)					
Index	6086h				
Name	Motor operating curve type				
Object structure	VAR	**Data type**	**Int16**	**Data range**	-2^{15}~(2^{15}-1)
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	0
Type of curve for motor position instruction or speed instruction. 0-Linear					

Object 6087h:Torque ramp（Torque Slope）					
Index	6087h				
Name	Torque ramp				
Object structure	VAR	**Data type**	**UInt32**	**Data range**	0~(2^{32}-1)
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	0
In Profile Torque Mode, Table shows the time (unit: ms) for the given torque to increase from 0% rated torque to 100%.					

Object 6091h:Gear ratio(Gear Ratio)					
Index	6091h				
Name	Gear ratio				
Object structure	VAR	**Data type**	**UInt32**	**Data range**	-
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	-
The Position setting factor is used to establish the proportional relationship between the user specified load position shift and the motor position shift: Motor Position Shift (motor unit)=Load Position Shift (user unit) × Position Setting Factor The setting of the Position setting factor is related to mechanical reduction ratio, mechanical size related parameters, and motor resolution. The calculation method is as follows: $$Position\ factor = \frac{\text{Motor resolution} \times \text{Gear Ratio}}{\text{Load feed rate}}$$					

Sub Index	00h				
Name	**Number of Sub Index**				
Object structure	VAR	**Data type**	Uint8	**Data range**	-
Can you map it	NO	**Accessibility**	RO	**factory setting**	2

Sub Index	01h				
Name	**Motor resolution (Motor revolutions)**				
Object structure	VAR	**Data type**	Uint32	**Data range**	1~(2^{32}-1)
Can you map it	RPDO	**Accessibility**	RW	**factory setting**	1

Sub Index	02h				
Name	**Axis resolution（Shaft revolutions）**				
Object structure	VAR	**Data type**	Uint32	**Data range**	1~(2^{32}-1)
Can you map it	RPDO	**Accessibility**	RW	**factory setting**	1

Object 6098h:Zeroing method（Homing method）					
Index	6098h				
Name	**Zeroing method**				
Object structure	VAR	**Data type**	Int8	**Data range**	1~35
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	1

Choose Origin Zeroing Method:

price	Describe
1	Regression with negative limit switch and Z-pulse signal
2	Regression with forward limit switch and Z-pulse signal
3,4	Regression with forward origin switch and Z-pulse signal
5,6	Regression with negative origin switch and Z-pulse signal
7~14	Regression with origin switch and Z-pulse signal
15~16	reserve
17~30	Regression without reference to Z-pulse signal
31~32	reserve
33~34	Regression of Z-pulse signal
35	Repeat the position with the current position

Object 6099h:Zeroing speed(Homing Speeds)					
Index	6099h				
Name	**Zeroing speed**				
Object structure	ARR	**Data type**	**-**	**Data range**	**-**
Can you map it	YES	**Accessibility**	RW	**Factory value**	-

In Homing Mode, there are 2 speed value settings included:
6099-1h search for deceleration point signal speed (unit: 0.01rpm);
6099-2h search for origin signal speed (unit: 0.01rpm).

Sub Index	00h				
Name	**Number of Sub Index**				
Object structure	VAR	**Data type**	Uint8	**Data range**	-
Can you map it	NO	**Accessibility**	RO	**factory setting**	2

Sub Index	01h				
Name	Speed During Search for Switch				
Object structure	VAR	**Data type**	Uint32	**Data range**	0 ~(2^{32}-1)
Can you map it	RPDO	**Accessibility**	RW	**factory setting**	27962026

Sub Index	02h				
Name	Speed During Search for Switch				
Object structure	VAR	Data type	Uint32	Data range	0 ~(2^{32}-1)
Can you map it	RPDO	Accessibility	RW	factory setting	5592405

Object 609Ah:zeroing Acceleration(Homing Acceleration)					
Index	609Ah				
Name	**Zeroing Acceleration**				
Object structure	ARR	Data type	Uint32	Data range	0 ~(2^{32}-1)
Can you map it	RPDO	Accessibility	RW	Factory value	16000
Set Acceleration in Return to Zero mode at the origin. The object dictionary unit is defined as the incremental Position instruction per second (Instruction unit/s2).					

Object 60B0h:Position offset（Position offset）					
Index	60B0h				
Name	**Position offset**				
Object structure	ARR	Data type	Int32	Data range	-2^{31} ~(2^{31}-1)
Can you map it	RPDO	Accessibility	RW	Factory value	0
Used for Position instruction bias in Synchronization cycle Position mode, servo Target Position Setting=607Ah+60B0h.					

Object 60B1h:Velocity bias（Velocity Offset）					
Index	60B1h				
Name	**Velocity bias**				
Object structure	ARR	Data type	Int32	Data range	-2^{31} ~(2^{31}-1)
Can you map it	RPDO	Accessibility	RW	Factory value	0
Used for speed instruction bias in Synchronization cycle speed mode, servo Target speed=60FFh+60B1h.					

Object 60B2h:Torque bias（Torque Offset）					
Index	60B2h				
Name	**Torque bias**				
Object structure	ARR	Data type	Int16	Data range	-2^{15} ~(2^{15}-1)
Can you map it	RPDO	Accessibility	RW	Factory value	0
Used for Torque Instruction bias in Synchronization cycle torque mode, servo Target torque=6071h+60B2h.					

Object 60B8h:Probe function（Touch Probe Function）					
Index	60B8h				
Name	Probe function				
Object structure	VAR	Data type	**Uint16**	Data range	**0**
Can you map it	RPDO	Accessibility	RW	Factory value	0

Probe function, also known as Position latch function, can latch the Position information when there is a change in external DI signal or motor Z signal. This servo supports two Probe functions, which can latch four Position information. Probe 1 can choose DI (1-4) or Z signal as probe signal, and probe 2 can choose DI (1-4) or Z signal as probe signal.

Functions of Probe 1 and Probe 2:

Bit	Describe	range
0	Probe 1 Enable	0-- Probe 1 not enabled 1---Probe 1 Enable
1	Probe 1 triggers mode	0-- Single trigger 1-- Continuous triggering
2	Probe 1 trigger signal selection	0-- DI (1-4) input signal 1-- Z signal
3	NA	
4	Probe 1 rising edge enable	0-Rising edge not locked 1-- Rising edge latch
5	Probe 1 descent edge enable	0-- Falling edge not locked 1-- Falling edge latch
6-7	NA	
8	Probe 2 Enable	0-- Probe 2 not enabled 1---Probe 2 Enable
9	Probe 2 triggers mode	0-- Single trigger 1-- Continuous triggering
10	Probe 2 trigger signal selection	0-- DI (1-4) input signal 1-- Z signal
11	NA	
12	Probe 2 rising edge enable	0---0-Rising edge not locked1-- Rising edge latch
13	Probe 2 descent edge enable	0-- Falling edge not locked1-- Falling edge latch
14-15	NA	

Object 60B9h:Probe State（Touch Probe Status）					
Index	60B9h				
Name	Probe State				
Object structure	VAR	**Data type**	**Uint16**	**Data range**	**0**
Can you map it	TPDO	**Accessibility**	RO	**Factory value**	0

The states of probe 1 and probe 2.

Bit	Describe	备注
0	0-- Probe 1 not enabled 1---Probe 1 Enable	
1	0-Probe 1 rising edge latch not executed 1-Probe 1 rising edge latch executed	
2	0-Probe 1 falling edge latch not executed 1-Probe 1's falling edge latch has been executed	
3~5	NA	
6	0-DI (1-4) input signal 1-Z signal	
7	0-DI (1-4) is a low level 1- DI (1-4) is high level	
8	0-- Probe 2 not enabled 1---Probe 2 Enable	
9	0- Probe 2 rising edge latch not executed Probe 2 rising edge latch executed	
10	0-Probe 2 falling edge latch not executed 1-Probe 2's falling edge latch has been executed	
11~13	NA	
14	0-DI (1-4) input signal 1-Z signal	
15	0-DI (1-4) is a low level 1- DI (1-4) is high level	

Object 60BAh:Probe 1 rising edge position feedback（Touch Probe Pos1 Pos Value）					
Index	60BAh				
Name	**Probe 1 rising edge position feedback**				
Object structure	VAR	**Data type**	**Int32**	**Data range**	**-**
Can you map it	TPDO	**Accessibility**	RO	**Factory value**	-
Display the rising edge time of probe 1 signal, Position feedback（Instruction unit/s）。					

Object 60BBh:Position feedback of probe 1 descending edge（Touch Probe Pos1 Neg Value）					
Index	60BBh				
Name	**Position feedback of probe 1 descending edge**				
Object structure	VAR	**Data type**	**Int32**	**Data range**	**-**
Can you map it	TPDO	**Accessibility**	RO	**Factory value**	-
Display the falling edge time of probe 1 signal, Position feedback（Instruction unit/s）。					

Object 60BCh:Position feedback of probe 2 rising edge（Touch Probe Pos1 Pos Value）					
Index	60BCh				
Name	**Position feedback of probe 2 rising edge**				
Object structure	VAR	**Data type**	**Int32**	**Data range**	**-**

Can you map it	TPDO	Accessibility	RO	Factory value	-
Display the rising edge time of probe 2 signal, Position feedback（Instruction unit/s）。					

Object 60BDh:Position feedback of probe 2 descending edge（Touch Probe Pos2 Neg Value）					
Index	60BDh				
Name	Position feedback of probe 2 descending edge				
Object structure	VAR	Data type	Int32	Data range	-
Can you map it	TPDO	Accessibility	RO	Factory value	-
Display the falling edge time of probe 2 signal, Position feedback（Instruction unit/s）。					

Object 60E0h:Positive torque limit value (Positive torque limit)					
Index	60E0h				
Name	Positive torque limit				
Object structure	VAR	Data type	Uint16	Data range	0~3000
Can you map it	RPDO	Accessibility	RW	Factory value	3000
Limit the maximum forward torque value (unity 0.1%).					

Object 60C5h:Maximum Acceleration(Max acceleration)					
Index	60C5h				
Name	Maximum Acceleration				
Object structure	ARR	Data type	Uint32	Data range	0 ~(2^{32}-1)
Can you map it	RPDO	Accessibility	RW	Factory value	0
The object dictionary unit is defined as the incremental Position instruction per second (Instruction unit/s2).					

Object 60C6h:Maximum Deceleration(Max deceleration)					
Index	60C6h				
Name	Maximum Deceleration				
Object structure	ARR	Data type	Uint32	Data range	0 ~(2^{32}-1)
Can you map it	RPDO	Accessibility	RW	Factory value	0
The object dictionary unit is defined as the incremental Position instruction per second (Instruction unit/s2).					

Object 60E1h:Negative torque limit 值 (Negtive torque limit)					
Index	60E1h				
Name	Negative torque limit				
Object structure	VAR	Data type	Uint16	Data range	0~3000
Can you map it	RPDO	Accessibility	RW	Factory value	3000
Limit the maximum negative torque value (unity 0.1%).					

Object 60F4h:Positional deviation(Following Error Actual Value)					
Index	60F4h				
Name	Positional deviation				
Object structure	VAR	Data type	Int32	Data range	-2^{31}~(2^{31}-1)
Can you map it	TPDO	Accessibility	RO	Factory value	-
Display Position deviation (Instruction unit/s).					

Object 60FDh:Digital input (Digital Input)					
Index	**60FDh**				
Name	Digital input				
Object structure	VAR	**Data type**	**Uint32**	**Data range**	**0~0xFFFFFFFF**
Can you map it	TPDO	**Accessibility**	RO	**Factory value**	0

Reflect the current DI terminal logic of the drive, with 0Table indicating Invalid and 1Table indicating Effective

The DI signals shown in the tables for each position are as follows:

Bit	31	30~21	20~16	15~4	3	2	1	0
Describe	Z-pulse	reserve	DI signal	reserve	undefined	origin switch	Forward over travel switch	Reverse over travel switch

Object 60FEh:Digital output(Digital Output)					
Index	**60FEh**				
Name	Digital output				
Object structure	ARR	**Data type**	Uint32	**Data range**	**-**
Can you map it	TPDO	**Accessibility**	RO	**Factory value**	-
Reflect the current DO terminal logic of the drive, with 0Table indicating Invalid and 1Table indicating Effective					

Sub Index	00h				
Name	**Number of Sub Index**				
Object structure	VAR	**Data type**	Uint8	**Data range**	-
Can you map it	NO	**Accessibility**	RO	**factory setting**	2

Sub Index	01h				
Name	**Physical output**				
Object structure	VAR	**Data type**	Uint32	**Data range**	0~0xFFFFFFFF
Can you map it	TPDO	**Accessibility**	RO	**factory setting**	0
Invalid					

Sub Index	02h				
Name	Physical output enablement				
Object structure	VAR	**Data type**	Uint32	**Data range**	0~0xFFFFFFFF
Can you map it	TPDO	**Accessibility**	RO	**factory setting**	0
Invalid					

Object 60FFh:Target speed (Target Velocity)					
Index	**60FFh**				
Name	Target speed				
Object structure	VAR	**Data type**	Int32	**Data range**	-2^{31}~(2^{31}-1)
Can you map it	RPDO	**Accessibility**	RW	**Factory value**	-
Set the speed instruction (unit: Instruction unit/s) in Profile Velocity Mode and Synchronization cycle speed mode.					

Object 6502h:Support Servo operation mode (Supported Drive Modes)					
Index	**6502h**				
Name	Support Servo operation mode				
Object structure	VAR	**Data type**	Uint32	**Data range**	0~(2^{32}-1)
Can you map it	TPDO	**Accessibility**	RO	**Factory value**	-

The Servo operation mode supported by the drive is not supported by 0Table, but supported by 1Table.

Position	Describe	值
0	Profile Position Mode	1
1	Variable frequency speed regulation mode	0
2	Profile Velocity Mode	1
3	Profile Torque Mode	1
4	NA	0
5	Homing Mode	1
6	Interpolation Position Set Mode	0
7	Cyclic Synchronous Position Mode(csp)	1
8	Cyclic Synchronous Velocity Mode (CSV)	1
9	Cyclic Synchronous Torque Mode (CST)	1
10~31	Manufacturer customization	Reserve

Attention: The parameters of 6000h, 6800h, and 7000h groups are consistent, refer to the 6000h parameters

10. MT Series Motors

10.1 Product Information

10.1.1 Motor Naming Rules

MT8-60B01330Y-U6Z

Sign	Motor serial number
MT3	MT3 series servo motor
MT8	MT8 series servo motor
MT5	MT5 series servo motor
--	Motors of other series

Sign	Flange
40	40flange
60	60flange
80	80flange
--	Flanges of other specifications

Sign	Motor type
A	4 Pole Pairs Medium inertia
B	5 Pole Pairs Large inertia
F	5 Pole Pairs Small inertia
M	5 Pole Pairs Medium inertia
--	Motors of other types of

Sign	Rated torque
003	0.3N·m
006	0.6N·m
013	1.3N·m
--	Torque of other specifications

Sign	Rated speed
15	1500rpm
20	2000rpm
30	3000rpm
--	Rotational speed of other specifications

Sign	Brake
Default	No brake
Z	With brake

Sign	Encoder type
U*	U6 23 bit multi circle optical encoder U1 23 bit multi circle optical encoder
D1	17 bit multi turn magnetic encoder
H1	17 bit single coil magnetic encoder
--	Encoders of other specifications of

Sign	Motor plug type
Default	Standard AP head or standard aviation plug
Y	Press cover type plug
P	IP68 plug
--	Plugs of other specifications

10.1.2 Motor Nameplate

10.2 MT1 Series Motors

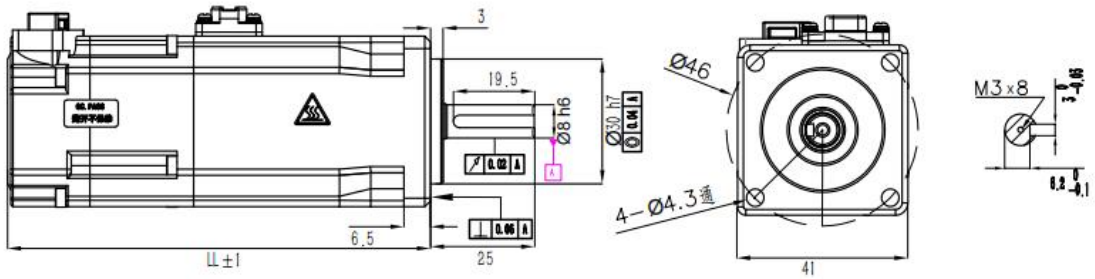
10.2.1 Selection List

MT1 series motor selection table（40-60-80 flange motor）

Model MT1-		40B00330	60B00630	60B01330	80B02430	80B03230
Flange size	mm	40	60	60	80	80
Rated voltage	V	220	220	220	220	220
Rated power	kW	0.1	0.2	0.4	0.75	1.0
Rated torque	N•m	0.32	0.64	1.27	2.39	3.2
Instantaneous maximum torque	N•m	0.96	1.92	3.82	7.17	9.6
Rated current	Arms	1	1.8	2.8	4.8	4.8
Instantaneous maximum current	Arms	3	5.4	8.4	14.4	14.4
Rated speed	r/min	3000	3000	3000	3000	3000
Instantaneous maximum speed	r/min	6000	6000	5000	5000	4000
Rotor inertia (standard/brake)	Kg*cm2	0.06/0.08	0.32/0.37	0.68/0.73	1.72/1.77	2.4/2.45
Weight (standard/brake)）	Kg	0.5/0.65	0.9/1.2	1.22/1.65	2.2/3	2.71/3.36
Body length (standard/brake)	mm	81.5/101.5	77/104	96/123	106/140	120/154
Motor code（17/23 bit encoder）		1137/1136	1139/1138	1345/1344	1499/1498	1481/1480
Corresponding power range of the driving module		S5R0C	S5R0C	S5R0C	S5R0C	S5R0C
Protection grade		IP65				

10.2.2 Motor Dimensions

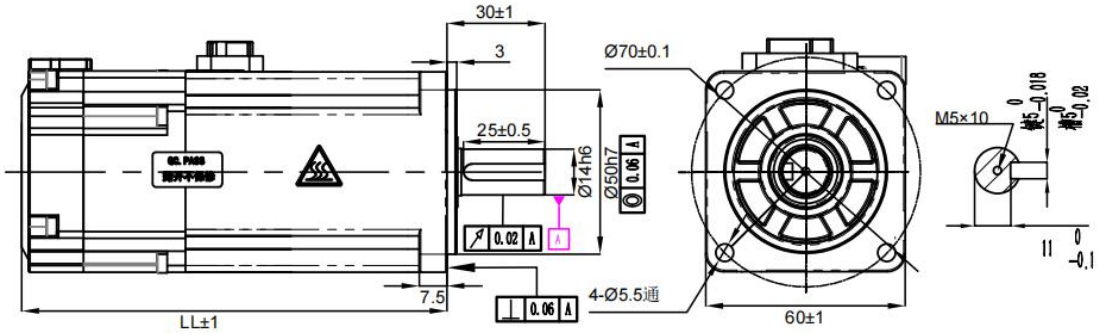
MT1 Series 40 Base Motor Dimensions (Unitmm):



Power（kW）	LL(mm)
0.1	81.5（101.5）

Note: The numerical table in () shows the data of the belt holding brake

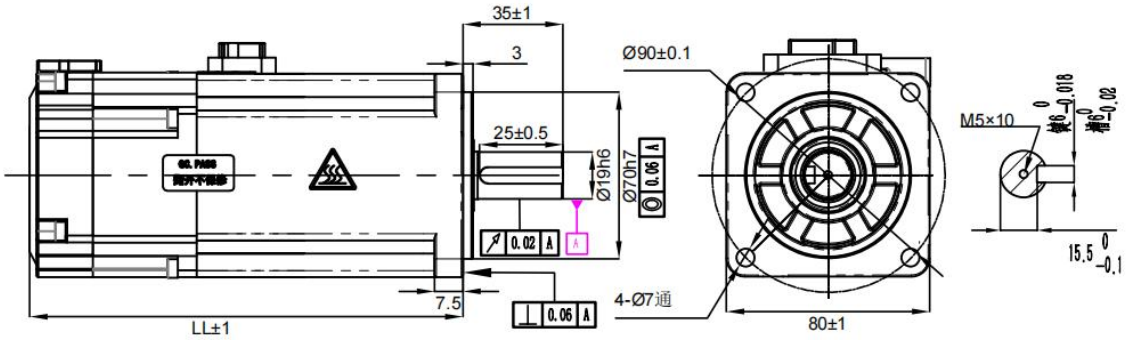
MT1 Series 60 Base Motor Dimensions (Unitmm):



Power（kW）	LL(mm)
0.2	77（104）
0.4	96（123）

Note: The numerical table in () shows the data of the belt holding brake

MT1 Series 80 Base Motor Dimensions (Unitmm):



Power（kW）	LL(mm)
0.75	106（140）
1.0	120（154）

Note: The numerical table in () shows the data of the belt holding brake

10.3 MT8 Series Motors

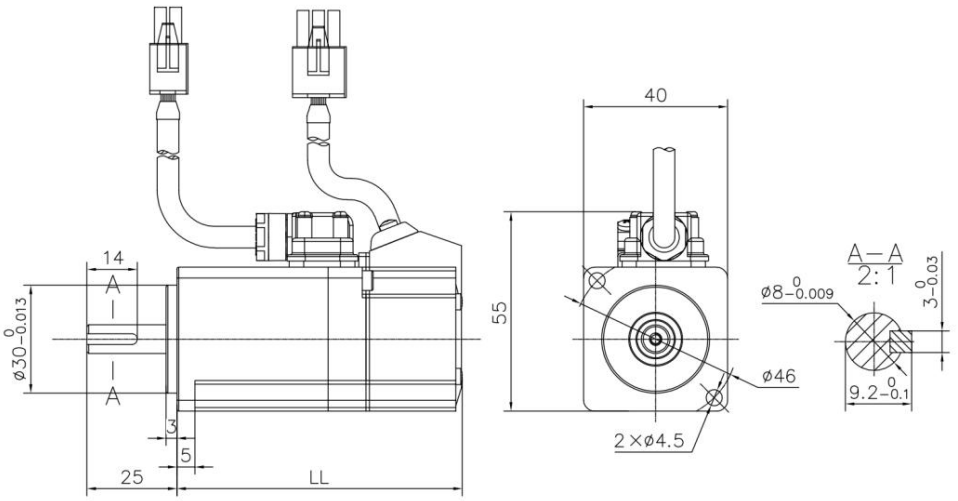
10.3.1 Selection List

MT8 series motor selection table（40-60-80 flange motor）

Model MT8-		40B00330	60B00630	60B01330	80B02430	80B03230
Flange size	mm	40	60	60	80	80
Rated voltage	V	220	220	220	220	220
Rated power	kW	0.1	0.2	0.4	0.75	1.0
Rated torque	N•m	0.32	0.64	1.27	2.4	3.2
Instantaneous maximum torque	N•m	0.96	1.92	3.81	7.2	9.6
Rated current	Arms	1	1.4	2.8	5.0	5.5
Instantaneous maximum current	Arms	3	4.2	8.4	15	16.5
Rated speed	r/min	3000	3000	3000	3000	3000
Instantaneous maximum speed	r/min	6000	6000	6000	6000	4500
Rotor inertia (standard/brake)	Kg*cm2	0.05/0.053	0.29/0.32	0.53/0.56	1.62/1.72	2.1/2.2
Weight (standard/brake)）	Kg	0.55/0.85	1/1.4	1.3/1.7	2.5/3.5	3.2/4.2
Body length (standard/brake)	mm	79.5/112.5	77.2/109.2	93.7/125.7	105/142	119/156
Motor code（17/23 bit encoder）		1277/1276	1271/1270	1359/1358	1477/1476	1485/1484
Corresponding power range of the driving module		S5R0C	S5R0C	S5R0C	S5R0C	S5R0C
Protection grade		IP65				

10.3.2 Motor Dimensions

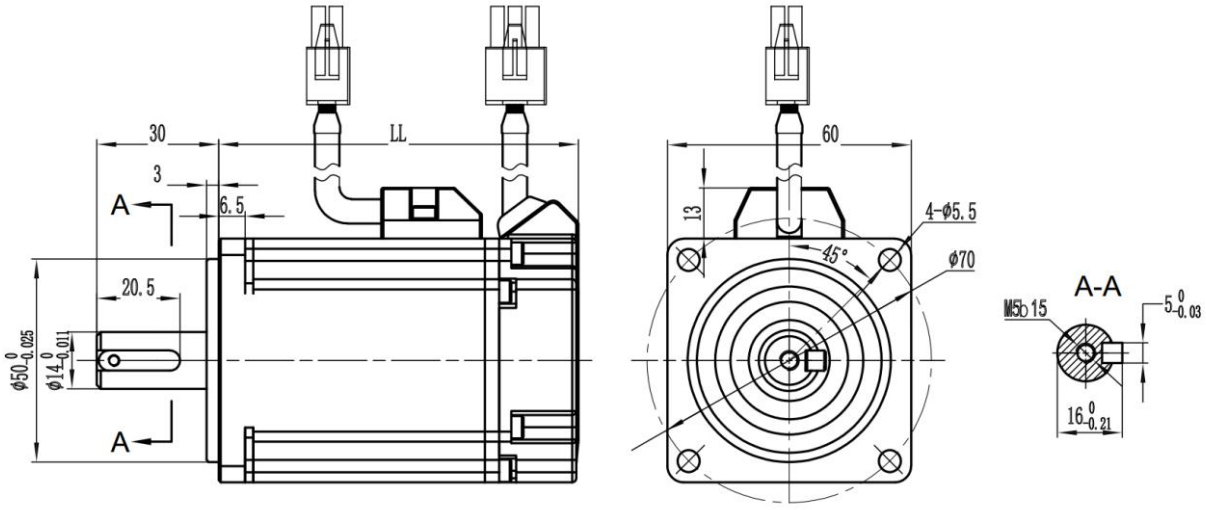
MT8 series 40 base motor external dimensions:



Power（kW）	LL(mm)
0.1	79.5（112.5）

Note: The numerical table in () shows the data of the belt holding brake

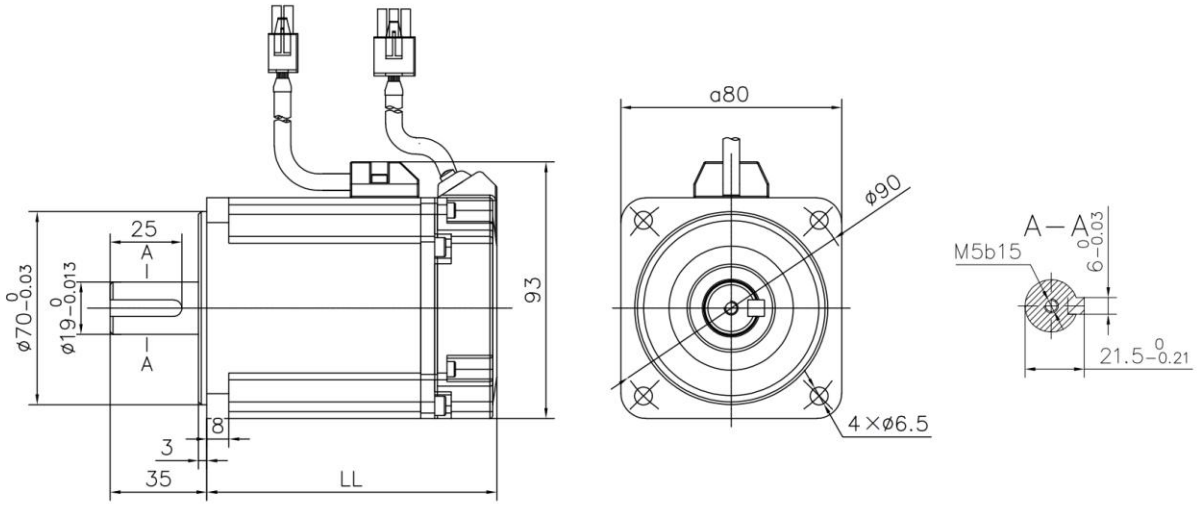
MT8 series 60 base motor external dimensions:



Power（kW）	LL(mm)
0.2	77.2（109.2）
0.4	93.7（125.7）

Note: The numerical table in () shows the data of the belt holding brake

MT8 series 80 base motor external dimensions:



Power（kW）	LL(mm)
0.75	105（142）
1.0	119（156）

Note: The numerical table in () shows the data of the belt holding brake

10.4 MT5-A Series Motors

10.4.1 Selection List

MT5-A series motor selection table（110 flange motor）

Model MT5-		110A04030	110A05030	110A06030
Flange size	mm	110	110	110
Rated voltage	V	220V	220V	220V
Rated power	kW	1.2	1.5	1.8
Rated torque	N•m	4	5	6
Instantaneous maximum torque	N•m	12	15	18
Rated current	Arms	5	6	7
Instantaneous maximum current	Arms	15	18	21
Rated speed	r/min	3000	3000	3000
Instantaneous maximum speed	r/min	3500	3500	3500
Rotor inertia (standard/brake)	Kg*cm2	7.3/8.8	9.2/10.7	10.8/12.3
Weight (standard/brake)）	Kg	5.2/6.7	6.05/7.55	6.65/8.15
Body length (standard/brake)	mm	189/263	204/263	219/293
Motor code（17/23 bit encoder）		1473/1472	1607/1606	1653/1652
Corresponding power range of the driving module		S5R0C	S8R0C	S8R0C
Protection grade		IP65		

MT5-A series motor selection table（130 flange motor）

Model MT5-		130A04025	130A05025	130A06025	130A07725	130A10025	130A15025
Flange size	mm	130	130	130	130	130	130
Rated voltage	V	220V	220V	220V	220V	220V	220V
Rated power	kW	1.0	1.3	1.5	2	2.6	3.8
Rated torque	N•m	4	5	6	7.7	10	15
Instantaneous maximum torque	N•m	10	12.5	15	19.2	18	23
Rated current	Arms	4	5	6	7.5	10	13.5
Instantaneous maximum current	Arms	10	12.5	15	18.7	18	20.7
Rated speed	r/min	2500	2500	2500	2500	2500	2500
Instantaneous maximum speed	r/min	3000	3000	3000	3000	3000	3000
Rotor inertia	Kg*c	9.6/10.1	10.7/11.2	12.9/13.4	14.1/14.6	18.8/20.28	25.5/27

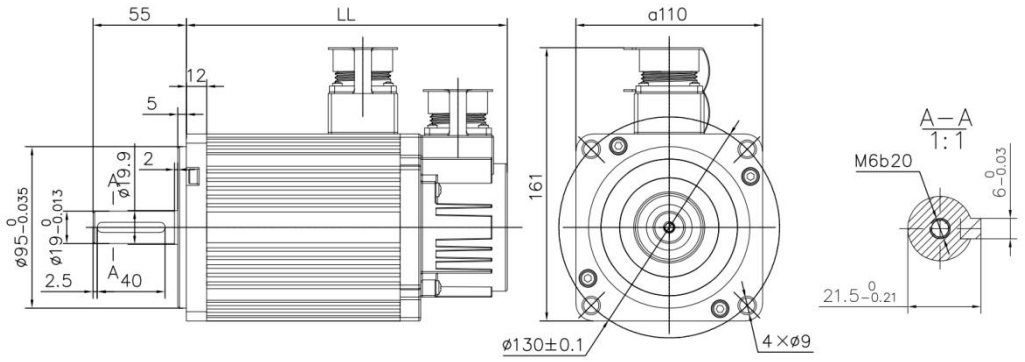
(standard/brake)	m2						
Weight (standard/brake)）	Kg	5.5/7.5	5.8/7.8	6.6/8.6	7.1/7.1	8.5/10.5	10.1/12.1
Body length (standard/brake)	mm	166/224	171/224	179/224	192/229	209/265	231/282
Motor code（17/23 bit encoder）		1451/1450	1391/1390	1657/1656	1675/1674	1919/1918	1897/1896
Corresponding power range of the driving module		S5R0C	S5R0C	S8R0C	S8R0C	S015C	S015C
Protection grade		IP65					

MT5-A series motor selection table（180 flange motor）

Model MT5-		180A17215	180A19015	180A27015	180A35015	180A48015
Flange size	mm	180	180	180	180	180
Rated voltage	V	220V	220V	380V	380V	380V
Rated power	kW	2.7	3.0	4.3	5.5	7.5
Rated torque	N•m	17.2	19	27	35	48
Instantaneous maximum torque	N•m	51.6	57	81	105	120
Rated current	Arms	10.5	12	10	12	20
Instantaneous maximum current	Arms	31.5	36	30	36	50
Rated speed	r/min	1500	1500	1500	1500	1500
Instantaneous maximum speed	r/min	1650	1800	1750	1750	1750
Rotor inertia (standard/brake)	Kg*cm2	56.1/62.1	63.5/69.5	88.5/94.5	114.4/120.4	137.3/143.3
Weight (standard/brake)	Kg	15.4/19.9	16.7/21.1	21.1/25.6	25.6/30.1	30.8/35.3
Body length (standard/brake)	mm	197/244	205/252	232/279	260/307	305/352
Motor code（17/23 bit encoder）		1943/1942	1867/1866	3331/3330	3333/3332	3365/3364
Corresponding power range of the driving module		S015C	S015C	T015	T015	T020
Protection grade		IP65				

10.4.2 Motor Dimensions

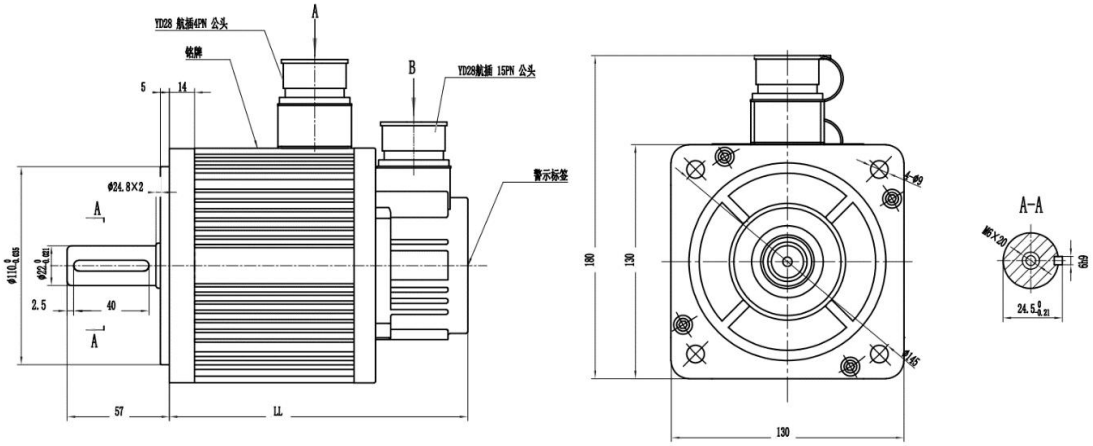
MT5-A series 110 base motor external dimensions:



Power（kW）	LL(mm)
1.2	189（263）
1.5	204（263）
1.8	219（293）

Note: The numerical table in () shows the data of the belt holding brake

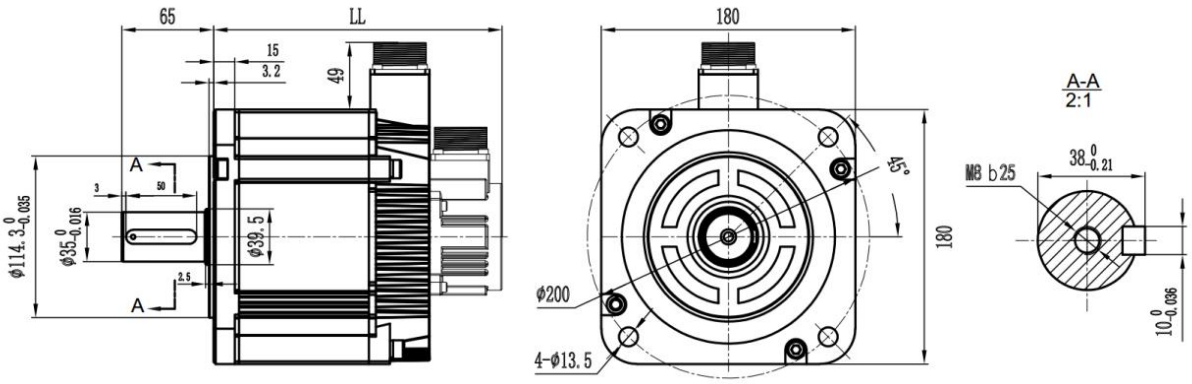
MT5-A Series 130 Base Motor Dimensions:



Power（kW）	LL(mm)
1.0	166（224）
1.3	171（224）
1.5	179（224）
2.0	192（229）
2.6	209（265）
3.8	231（282）

Note: The numerical table in () shows the data of the belt holding brake

MT5-A series 180 base motor external dimensions:



Power（kW）	LL(mm)
2.7	197（244）
3.0	205（252）
4.3	232（279）
5.5	260（307）
7.5	305（352）

Note: The numerical table in () shows the data of the belt holding brake10.5 MT5-Bseries motors

10.5.1 Selection List

MT5-B series motor selection table（130 flange motor）

Model MT5-		130B05415	130B07220	130B08315	130B11515
Flange size	mm	130	130	130	130
Rated voltage	V	220	220	220	220
Rated power	kW	1.5	1.5	1.8	2.5
Rated torque	N•m	5.39	7.2	8.34	11.5
Instantaneous maximum torque	N•m	16.17	21.6	23.3	28.7
Rated current	Arms	6.9	8.6	10.7	13.8
Instantaneous maximum current	Arms	20.7	25.8	32.1	41.4
Rated speed	r/min	1500	2000	1500	1500
Instantaneous maximum speed	r/min	3000	3000	3000	3000
Rotor inertia (standard/brake)	Kg*cm2	14.6/16.8	16.9/19	16.9/19	21.4/23.5
Weight (standard/brake)）	Kg	6.2/7.5	7.6/9.6	7.6/9.6	9.3/11.3
Body length (standard/brake)	mm	149/182	159/192	159/192	177/210
Motor code（23 Position Coder）		1576	1592	1848	1850
Corresponding power range of the driving module		S8R0C	S8R0C	S015C	S015C

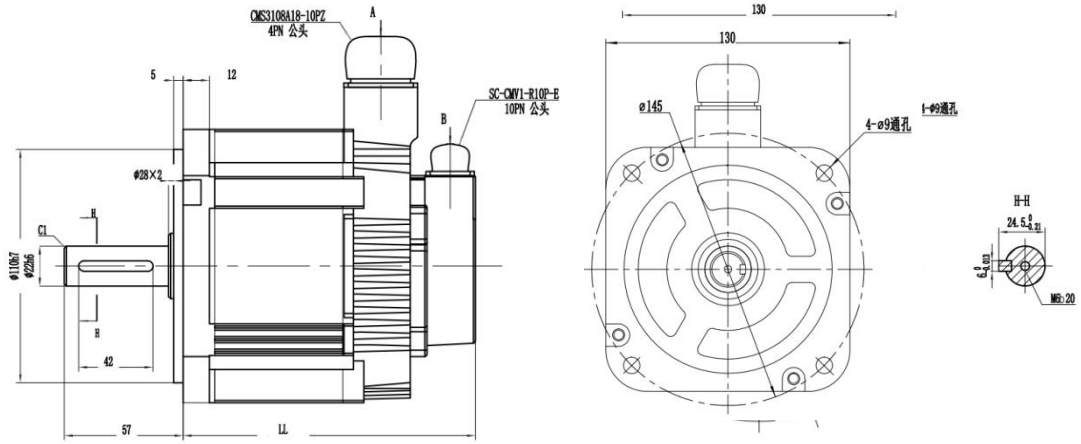
Protection grade	IP65

MT5-B series motor selection table（180 flange motor）

Model MT5-		180B18615	180B28415	180B35015	180B48015
Flange size	mm	180	180	180	180
Rated voltage	V	380	380	380	380
Rated power	kW	2.9	4.4	5.5	7.5
Rated torque	N•m	18.6	28.4	35	48
Instantaneous maximum torque	N•m	55.8	85.2	105	120
Rated current	Arms	11.9	16.5	20.8	26
Instantaneous maximum current	Arms	35.7	49.5	62.4	65
Rated speed	r/min	1500	1500	1500	1500
Instantaneous maximum speed	r/min	3000	3000	3000	3000
Rotor inertia (standard/brake)	Kg*cm2	63.5/69.5	88.5/94.5	114.4/120.4	136.6/142.6
Weight (standard/brake)	Kg	16.7/21.2	21.1/25.6	25.6/30.1	30.8/35.3
Body length (standard/brake)	mm	194/241	221/268	249/296	273/320
Motor code (23 Position Coder)		3360	3362	3420	3602
Corresponding power range of the driving module		T015	T020	T020	T025
Protection grade		IP65			

10.5.2 Motor Dimensions

MT5-B Series 130 Base Motor Dimensions:

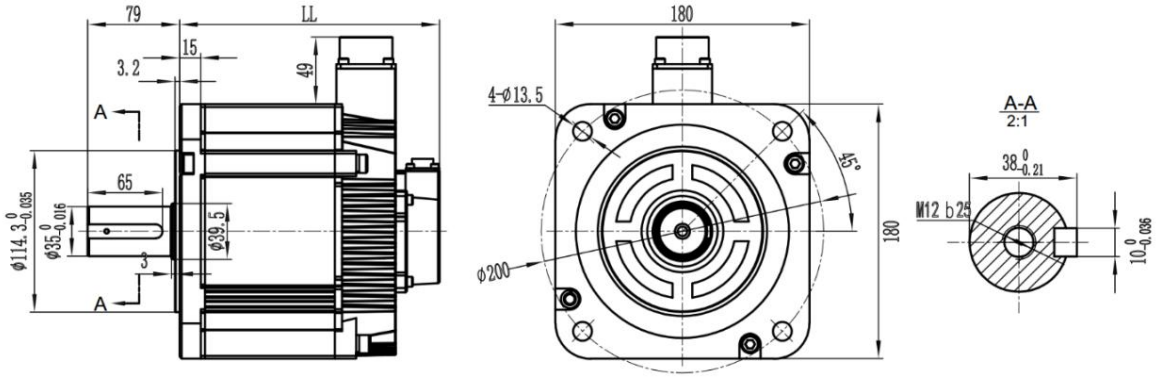


Power（kW）	LL(mm)

1.5	149（182）
1.5	159（192）
1.8	159（192）
2.5	177（210）

Note: The numerical table in () shows the data of the belt holding brake

MT5-B series 180 base motor external dimensions:



Power（kW）	LL(mm)
2.9	194（241）
4.4	221（268）
5.5	249（296）
7.5	273（320）

Note: The numerical table in () shows the data of the belt holding brake

10.6 MT5-F Series Motors

10.6.1 Selection List

MT5-F series motor selection table(100 flange motor)

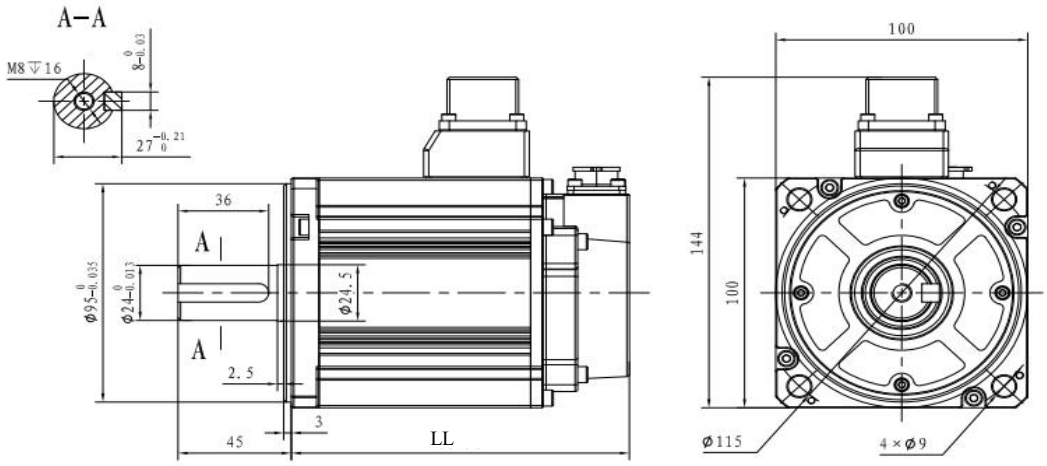
Model MT5-		100F03230	100F04830	100F06430	100F08030
Flange size	mm	100	100	100	100
Rated voltage	V	220	220	220	220
Rated power	kW	1.0	1.5	2.0	2.5
Rated torque	N•m	3.18	4.77	6.37	7.95
Instantaneous maximum torque	N•m	9.54	14.31	19.11	23.88
Rated current	Arms	7	10	11.6	14.5
Instantaneous maximum current	Arms	22	31	36	44
Rated speed	r/min	3000	3000	3000	3000

Instantaneous maximum speed	r/min	6000	6000	5000	5000
Rotor inertia (standard/brake)	Kg*cm2	2.26/3.0	3.1/3.83	3.93/4.66	4.76/5.5
Weight (standard/brake)）	Kg	4.0/5.0	5.0/6.0	6.0/7.0	7.0/8.0
Body length (standard/brake)	mm	141/172	161/191	180/210	199/229
Motor code（17/23 bit encoder）		1719/1718	1991/1990	1953/1952	1967/1966
Corresponding power range of the driving module		S8R0C	S015C	S015C	S015C
Protection grade		IP65			

Note: The MT5-100F series is a low inertia motor, with two options for motor shaft diameter/extension (24mm shaft diameter+45mm shaft extension/19mm shaft diameter+55mm shaft extension)

10.6.2 Motor Dimensions

MT5-F series 100 base motor external dimensions:



Power（kW）	LL(mm)
1.0	142（172）
1.5	161（191）
2.0	180（210）
2.5	199（229）

Note: The numerical table in () shows the data of the belt holding brake

10.7 MT5-M Series Motors

10.7.1 Selection List

MT5-M Series Motor selection table（130 flange motor）

Model MT5-		130M05415	130M07220	130M08315	130M11515
Flange size	mm	130	130	130	130
Rated voltage	V	220	220	220	220
Rated power	kW	1.5	1.5	1.8	2.5
Rated torque	N•m	5.39	7.16	8.34	11.5
Instantaneous	N•m	16.17	21.48	25.02	34.5
Rated current	Arms	6.9	8.6	10.7	13.8
Instantaneous	Arms	20.7	25.8	32.1	41.4
Rated speed	r/min	1500	2000	1500	1500
Instantaneous	r/min	3000	3000	3000	3000
Rotor inertia	Kg*cm2	14.8/16.03	16.9/18.13	16.9/18.13	21.4/22.63
Weight	Kg	6.2/8.2	7.2/9.2	7.2/9.2	8.7/11.3
Body length	mm	152.5/204.5	152.5/204.5	152.5/204.5	170/222
Motor code（17Position Coder）		1577	1593	1849	1851
Corresponding power range of the		S8R0C	S8R0C	S015C	S015C
Protection grade		IP65			

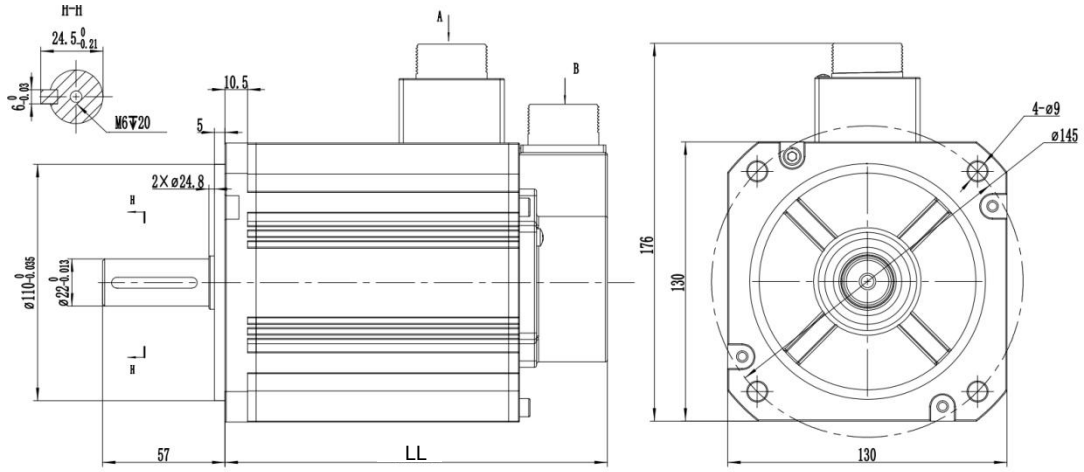
MT5-M Series Motor selection table（180 flange motor）

Model MT5-		180M18615	180M28415	180M35015	180M48015
Flange size	mm	180	180	180	180
Rated voltage	V	380	380	380	380
Rated power	kW	2.9	4.4	5.5	7.5
Rated torque	N•m	18.6	28.4	35	48
Instantaneous	N•m	55.8	85.2	105	120
Rated current	Arms	11.9	16.5	20.8	26
Instantaneous	Arms	35.7	49.5	62.4	65
Rated speed	r/min	1500	1500	1500	1500
Instantaneous	r/min	3000	3000	3000	3000
Rotor inertia	Kg*cm2	63.5/69.5	85.2/94.5	114.4/120.4	136.6/142.6
Weight	Kg	16.7/21.2	21.1/25.6	25.6/30.1	30.8/35.3
Body length	mm	205/252	232/279	260/307	284/331
Motor code（17Position Coder）		3361	3363	3421	3603

Corresponding power range of the	T015	T020	T020	T025
Protection grade	IP65			

10.7.2 Motor Dimensions

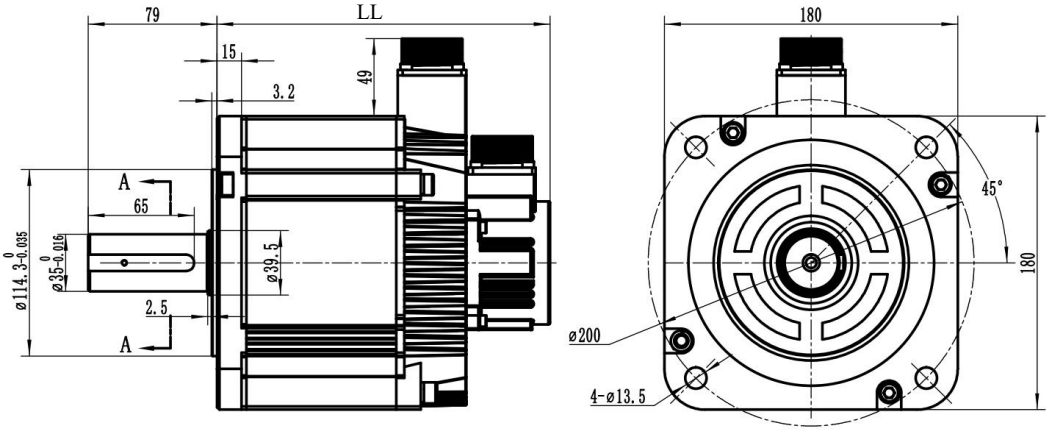
MT5-M Series 130 Base Motor Dimensions:



Power（kW）	LL(mm)
1.5	152.5（204.5）
1.5	152.5（204.5）
1.8	152.5（204.5）
2.5	170（222）

Note: The numerical table in () shows the data of the belt holding brake

MT5-M series 180 base motor external dimensions:

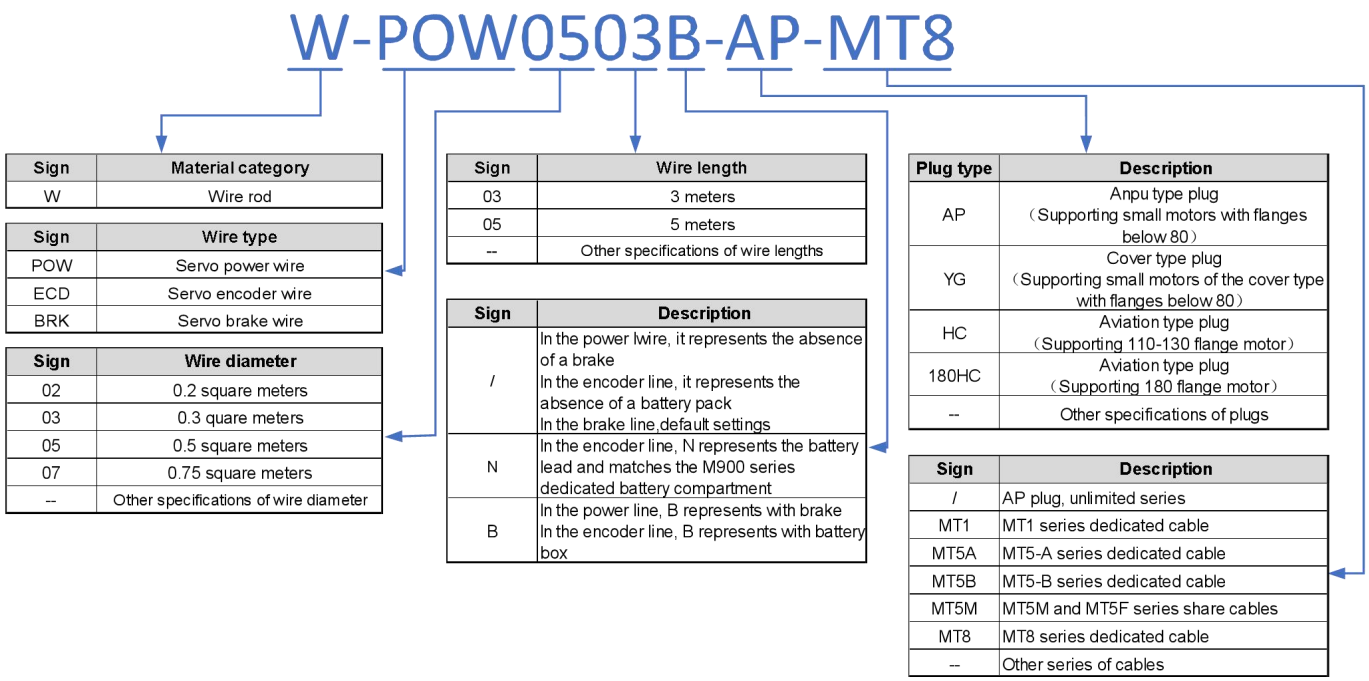


Power（kW）	LL(mm)
2.9	205（252）
4.4	232（279）
5.5	260（307）
7.5	284（331）

Note: The numerical table in () shows the data of the

11. Cables

11.1 Cable Naming Rules



Sign	Material category
W	Wire rod

Sign	Wire type
POW	Servo power wire
ECD	Servo encoder wire
BRK	Servo brake wire

Sign	Wire diameter
02	0.2 square meters
03	0.3 quare meters
05	0.5 square meters
07	0.75 square meters
--	Other specifications of wire diameter

Sign	Wire length
03	3 meters
05	5 meters
--	Other specifications of wire lengths

Sign	Description
/	In the power lwire, it represents the absence of a brake In the encoder line, it represents the absence of a battery pack In the brake line,default settings
N	In the encoder line, N represents the battery lead and matches the M900 series dedicated battery compartment
B	In the power line, B represents with brake In the encoder line, B represents with battery box

Plug type	Description
AP	Anpu type plug （Supporting small motors with flanges below 80）
YG	Cover type plug （Supporting small motors of the cover type with flanges below 80）
HC	Aviation type plug （Supporting 110-130 flange motor）
180HC	Aviation type plug （Supporting 180 flange motor）
--	Other specifications of plugs

Sign	Description
/	AP plug, unlimited series
MT1	MT1 series dedicated cable
MT5A	MT5-A series dedicated cable
MT5B	MT5-B series dedicated cable
MT5M	MT5M and MT5F series share cables
MT8	MT8 series dedicated cable
--	Other series of cables

11.2 Supporting Cable List

Motor model	Plug type	Cable model	Cable diameter	Wire type	Flange	Remarks
MT1	Cover type plug	W-POW03xx-YG-MT1	4*0.3	Motor power line	40 flange	Equipped with standard motor
		W-POW03xxB-YG-MT1	4*0.3+2*0.3			Equipped with brake motor
		W-POW05xx-YG-MT1	4*0.5		60-80 flange	Equipped with standard motor
		W-POW05xxB-YG-MT1	4*0.5+2*0.3			Equipped with brake motor
		W-ECD02xx-YG-MT1	4*0.2	Encoder line	40-60-80 flange	Equipped with a single coil motor
		W-ECD02xxN-YG-MT1	4*0.2+2*0.2			Equipped with multi turn motor (with battery lead)
MT8	Cover type plug	W-POW05xx-YG-MT8	4*0.5	Motor power line	40-60-80 flange	Equipped with standard motor
		W-POW05xxB-YG-MT8	4*0.5+2*0.3			Equipped with brake motor
		W-ECD02xx-YG-MT8	4*0.2	Encoder line		Equipped with standard motor
		W-ECD02xxN-YG-MT8	4*0.2+2*0.2			Equipped with multi turn motor (with battery lead)
MT1/MT8	Anpu type plug	W-POW05xxAP	4*0.5	Motor power line	40-60-80 flange	Equipped with standard motor
		W-POW05xxB-AP	4*0.5+2*0.3			Equipped with brake motor
		W-ECD02xx-AP	4*0.2	Encoder line		Equipped with a single coil motor
		W-ECD02xxN-AP	4*0.2+2*0.2			Equipped with multi turn motor (with battery lead)
MT5-A	Aviation	W-POW15xx-HC-MT5A	4*1.5	Motor	110-130-180	Equipped with standard motors of 110A and

	type plug			power line	flange	100A (below 10A)
		W-POW25xx-HC-MT5A	4*2.5			Equipped with a standard motor of 100A (10A or above)
		W-POW25xx-180HC-MT5A	4*2.5			Equipped with 180A flange standard motor
		W-ECD03xx-HC-MT5A	4*0.3	Encoder line		Equipped with a single coil motor
		W-ECD03xxN-HC-MT5A	4*0.3+2*0.3			Equipped with multi turn motor (with battery lead)
		W-BRK05xx-HC-MT5A	2*0.5	Motor brake wire		Equipped with holding brake line,to be used in conjunction with W-POW15xx-HC-MT5A or W-POW25xx-HC-MT5A
		W-BRK05xx-180HC-MT5A	2*0.5			Equipped with holding brake line,to be used in conjunction with W-POW25xx-180HC-MT5A
MT5-B	Aviation type plug	W-POW15xx-HC-MT5B	4*1.5	Motor power wire	130-180 flange	Equipped with a standard motor of 130B(10A or below)
		W-POW25xx-HC-MT5B	4*2.5			Equipped with a standard motor of 130B (10A or above)
		W-POW25xx-180HC-MT5B	4*2.5			Equipped with 180B flange standard motor
		W-ECD03xx-HC-MT5B	4*0.3	Encoder wire		Equipped with a single coil motor
		W-ECD03xxN-HC-MT5B	4*0.3+2*0.3			Equipped with multi turn motor (with battery lead)
		W-BRK05xx-HC-MT5B	2*0.5	Motor brake wire		Equipped with holding brake line,to be used in conjunction with W-POW15xx-HC-MT5B or W-POW25xx-HC-MT5B
		W-BRK05xx-180HC-MT5B	2*0.5			Equipped with holding brake line,to be used in conjunction with W-POW25xx-180HC-MT5B
MT5-M / MT5-F	Aviation type plug	W-POW15xx-HC-MT5M	4*1.5	Motor power wire	100-130-180 flange	Equipped with a brake motor of 100Fand130M(10A or below)
		W-POW15xxB-HC-MT5M	4*1.5+2*0.5			Equipped with a standard motor of 100Fand130M(10A or below)
		W-POW25xx-HC-MT5M	4*2.5			Equipped with a standard motor of 100F and130M (10A or above)
		W-POW25xxB-HC-MT5M	4*2.5+2*0.5			Equipped with a brake motor of 100Fand130M/130F(10A or above)
		W-POW25xx-180HC-MT5M	4*2.5			Equipped with 180M flange standard motor
		W-BRK05xx-180HC-MT5M	2*0.5	Brake wire		Equipped with holding brake line,to be used in conjunction with W-POW25xx-180HC-MT5M
		W-ECD03xx-HC-MT5M	4*0.3	Encoder wire		Equipped with a single coil motor
		W-ECD03xxN-HC-MT5M	4*0.3+2*0.3			Equipped with multi turn motor (with battery lead)
Note: xx represents different cable lengths						