

R920 series servo drive for robots simplified user manual R1.7

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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By purchasing MT Drive products, you are entitled to standard after-sales service during the warranty period, mainly through repair or replacement. For details, please consult your purchasing contact. MT Drive & Control (Shenzhen) Co., Ltd. reserves the right of final decision regarding the handling method. The warranty service is limited to the main body of the MT Drive product and accessories supplied with the product. We assume no derivative liability, direct or indirect, for the customer's equipment or system.

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Revision History

Revision date	Release version	Change Description
2024-05	R1.0	● First edition
2025-02	R1.1	● Updated appearance drawings, dimension drawings, and terminal definitions
2025-05	R1.2	● Added new wiring diagrams ● Added function codes ● Added new models
2025-06	R1.3	● Updated product rendering
2025-08	R1.4	● Added Err50~Err56 alarm records ● Updated terminal definition diagrams ● Updated naming rules ● Other minor revisions
2025-09	R1.5	● Deleted the Servo Parameter Group, monitoring parameter group, and alarm code description of the power module ● Added alarm descriptions ● Added new models
2025-12	R1.6	● Deleted P0-16 and duplicate 0-5 ● Added Error04 alarm ● Added model selection list
2026-4	R1.7	● Added keypad operation method

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1. 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.

1.1 Safety 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 risk of fire.

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 cable 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

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!
- Do not power on the servo drive unless the cover plate is installed, 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 or 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 power-on, the servo drive automatically carries out safety detection on the external power 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 a contactor for on/off control to control the start and stop of the driver, otherwise the equipment will be damaged.



- Never repair or maintain the equipment while power is applied, 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 500 V megohmmeter to ensure that the measured insulation resistance is not less than 5 MΩ.

1.2.2 Motor

It is strictly forbidden to knock any position of the motor, especially the protruding 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

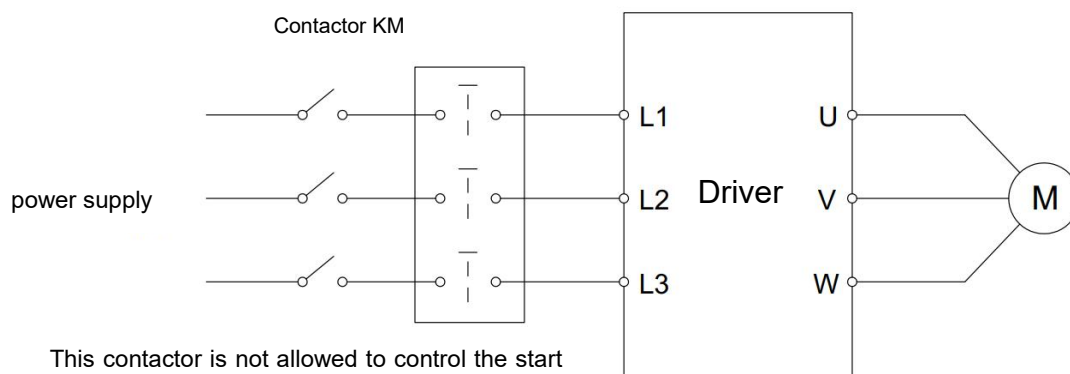
The output voltage of servo drive is PWM waveform, which contains certain harmonics, so the temperature rise, noise and vibration of motor may slightly increase compared with line-frequency operation.

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 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.

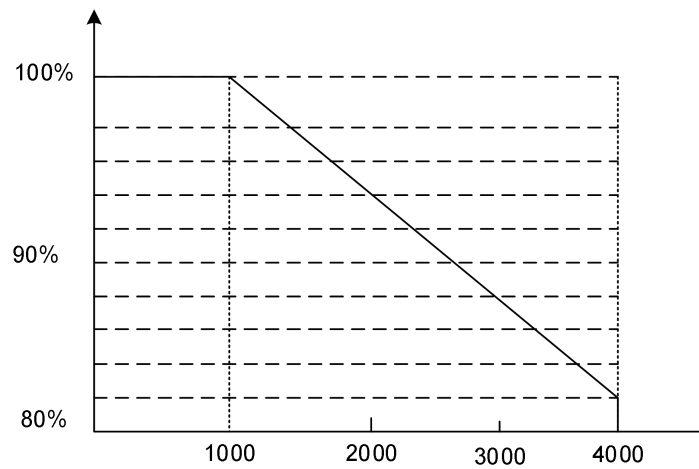


This contactor is not allowed to control the start and stop of the drive. When it must be used, the interval should not be less than 1 hour.

Figure 1-2

1.2.6 Altitude and Derating

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



Drive rated output current and altitude derating curve

Figure 1-3

1.2.7 Precautions When Scrapping the Servo Drive

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

1.2.8 Drive Precautions

When the drive incurs over-current Er.002 ~ Er005, Er.009 ~ Er0012 and other faults, and the fault occurs again if it is started again, troubleshoot the fault, and do not restart it repeatedly, otherwise the drive inverter module may be damaged by the impact of large current.

2. Product Information

2.1 Product Features

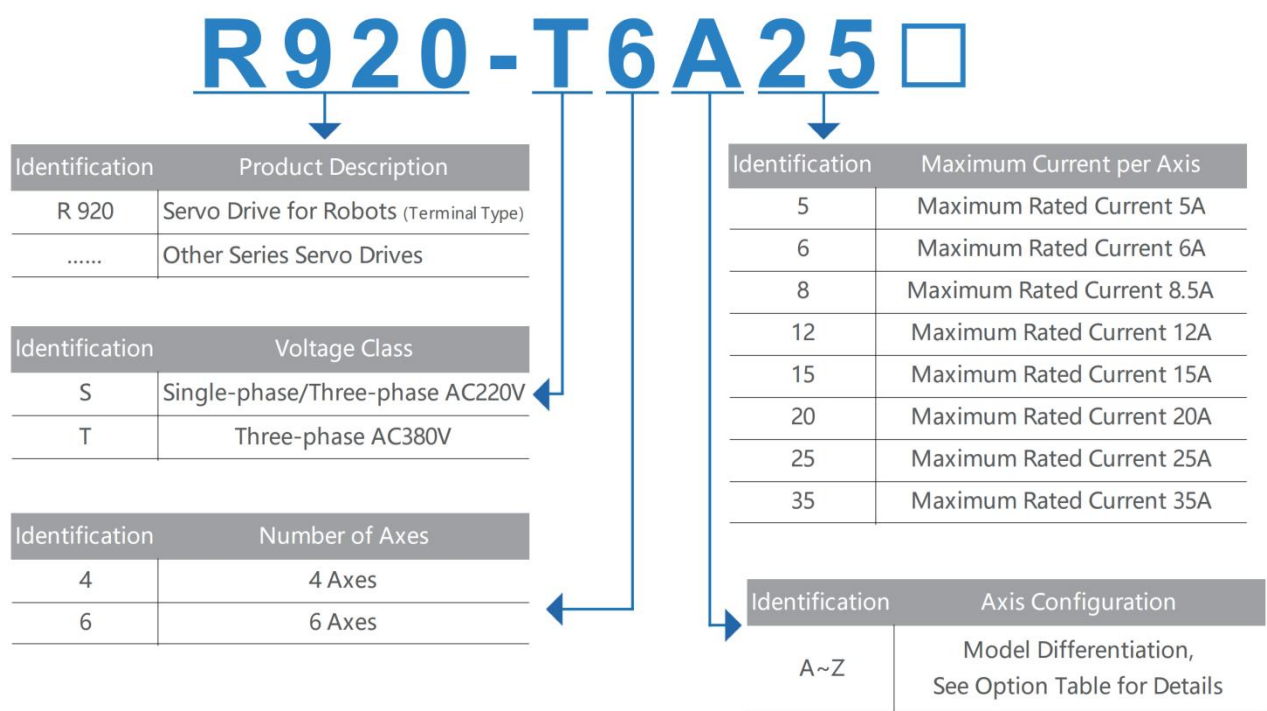
The R920 series robot-specific servo drive is a high-performance multi-axis integrated servo drive designed for a wide range of robot applications. Compared with multi-axis modular servo drives, it is smaller and more compact. With its multi-axis integrated design, a six-axis servo drive can be as small as an A4 sheet of paper. The series provides rich power combinations and covers robot payload requirements from 1.5 kg to 1500 kg. It supports multiple robot types, including SCARA, Delta, four-axis palletizing, and six-axis articulated robots. It also supports the mainstream EtherCAT communication protocol and is widely applicable to various robot bus-based applications.

2.2 Product Characteristics

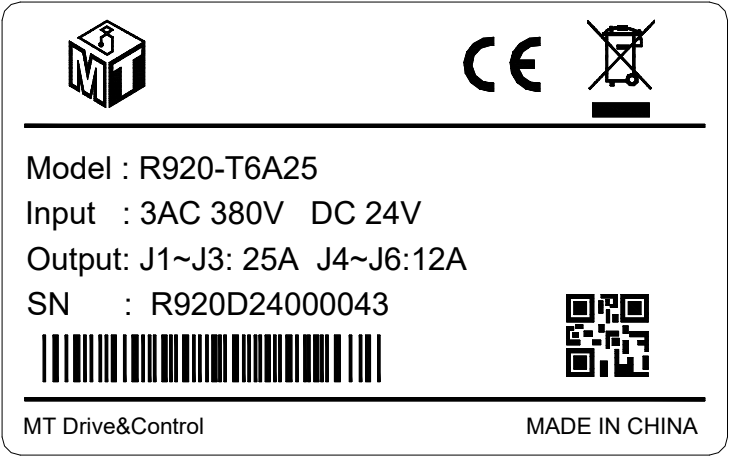


Compact Structure	Flat multi-axis integrated structure; easy to install, adaptable to different control cabinets, and more compact;
Easy Commissioning	Various commissioning tools such as PC debugging and network debugging are available on the upper computer, and the system has parameter identification function. Only simple parameters need to be commissioned before use, which improves commissioning efficiency;
Easy Installation	Pluggable quick-connect terminals; easy assembly and disassembly, tool-free maintenance, and reduced maintenance costs;
High-Speed Response	The transmission speed can reach 100 Mbps, the communication cycle can be as short as 125 us, and the mainstream EtherCAT bus communication protocol is supported;
Safe and Reliable	Built-in advanced application functions, such as dynamic braking and STO Safe Torque Off.

2.3 Naming Rules



2.4 Body Label Naming Rules



2.5 Model Selection List

Product Model	Rated Axis Current (unit: Arms)						
	Rated voltage	1 axis	2 axis	3 axis	4 axis	5 axis	Axis 6
R920-S6A05	220 V	5	5	5	5	5	5
R920-S6A08	220 V	8	8	5	5	5	5
R920-S6B08	220 V	8	8	8	5	5	5
R920-S6C08	220 V	8	8	8	8	5	5
R920-S5A05	220 V	5	5	5	5	5	-
R920-S5A08	220 V	8	8	8	5	5	-
R920-S6A15	220 V	15	15	5	5	5	5
R920-S6B15	220 V	15	15	8	5	5	5
R920-S6C15	220 V	15	15	15	5	5	5
R920-S6E15	220 V	15	5	5	5	5	5
R920-S2 A05	220 V	5	5	-	-	-	-
R920-S3 A05	220 V	5	5	5	-	-	-
R920-S4A05	220 V	5	5	5	5	-	-
R920-S4A08	220 V	8	5	5	5	-	-
R920-S4B08	220 V	8	8	5	5	-	-
R920-S4C08	220 V	8	8	8	5	-	-
R920-S4D08	220 V	8	8	8	8	-	-
R920-S4A15	220 V	15	15	5	5	-	-
R920-S4B15	220 V	15	15	15	5	-	-
R920-S4C15	220 V	15	15	8	5	-	-
R920-S4D15	220 V	15	8	5	5	-	-
R920-T5 A08	380 V	8.5	8.5	8.5	8.5	8.5	-
R920-T6C12	380 V	12	12	12	6	6	6
R920-T6D12	380 V	12	12	8.5	8.5	6	6
R920-T4 A06	380 V	6	6	6	6	-	-
R920-T4 A12	380 V	12	12	12	6	-	-
R920-T4B12	380 V	12	12	6	6	-	-
R920-T5 A20	380 V	20	8.5	8.5	8.5	8.5	-
R920-T6A20	380 V	20	20	20	6	6	6
R920-T6B20	380 V	20	20	12	6	6	6
R920-T6C20	380 V	20	20	12	8.5	6	6
R920-T6E20	380 V	20	6	6	6	6	6
R920-T6A25	380 V	25	25	25	12	12	12
R920-T6B25	380 V	25	25	12	12	12	12

Product Model	Rated Axis Current (unit: Arms)						
	Rated voltage	1 axis	2 axis	3 axis	4 axis	5 axis	Axis 6
R920-T6C25	380 V	25	25	25	8.5	8.5	6
R920-T6D25	380 V	25	20	20	20	20	20
R920-T6E25	380 V	25	25	20	12	6	6
R920-T6F25	380 V	25	25	20	8.5	8.5	8.5
R920-T6G25	380 V	25	25	20	12	12	6
R920-T6H25	380 V	25	25	20	8.5	6	6
R920-T6A35	380 V	35	35	25	20	20	12
R920-T6B35	380 V	35	25	25	12	12	12
R920-T4A20	380 V	20	20	20	6	-	-
R920-T4B20	380 V	20	20	12	6	-	-
R920-T4C20	380 V	20	20	20	8.5	-	-
R920-T4D20	380 V	20	12	6	6	-	-
R920-T4E20	380 V	20	12	6	6	-	-
R920-T4F20	380 V	20	20	6	6	-	-
R920-T4A25	380 V	25	25	12	6	-	-
R920-T4B25	380 V	25	25	25	6	-	-
R920-T4C25	380 V	25	25	25	12	-	-
R920-T4D25	380 V	25	25	12	12	-	-
R920-T4E25	380 V	25	25	20	8.5	-	-
R920-T4F25	380 V	25	25	8.5	6	-	-
R920-T4A35	380 V	35	35	20	20	-	-
R920-T4B35	380 V	35	35	25	20	-	-

Note: The models listed above are partial examples. If you need to know more models, please contact MT Drive technical support.

3. Product Specifications

3.1 Technical Specifications

Project		Description
Basic functions	Voltage Rating	Single-phase/three-phase AC 220 V (-15%~+10%), three-phase AC 380 V (-15%~+10%) (When single-phase AC220 V is connected, it is connected through L1/L3 terminals)
	Power Range	50 W~18.5 kW
	Dynamic Braking	The 220 V model is equipped with an internal dynamic brake, while the 380 V model is optionally equipped with an external dynamic brake
	Commissioning Software	iMoto_Studio
	Brake Power Input	24 V brake power input
	Brake Output Port	When the holding current of the 24 V motor brake is ≤ 1.5 A, the motor brake can be driven directly without a relay; When the motor brake current is greater than 1.5 A, or when the total brake current of the six axes is greater than 6 A, an external relay is required to drive the motor brake
	Brake Resistor Interface	Connect the braking resistor
Bus	Control Mode	Supports speed, position, torque, and hybrid control modes to meet the flexibility requirements of different application environments for control
I/O Interface	DI/DO	Standard configuration 16DI/DO and support EtherCAT bus calls
Commissioning Interface	Power Output Port	IP20 power output 220 V/380 V two types
	Encoder Port	Connect the motor encoder
	Commissioning Interface	USB Type-C port, PANEL commissioning keypad connection port
Communication Interface	EtherCAT IN EtherCAT OUT	Minimum communication cycle: 125 us The transmission cable can be up to 100 meters in length Supports 100 Mbps full-duplex operation
Safety Interface	STO interface + safety circuit	Safe Torque Off connection terminal

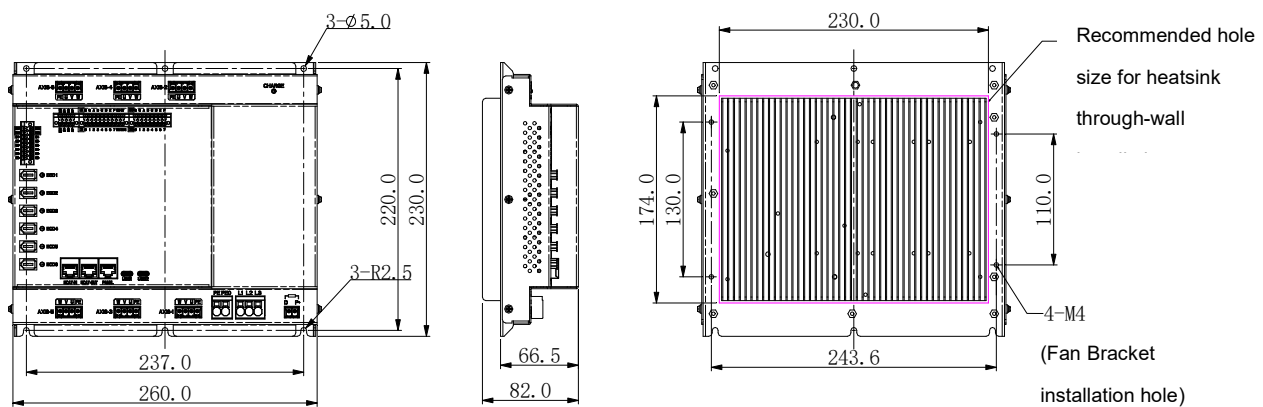
Mounting Method	Construction Type	Sheet metal housing + base aluminum profile heatsink
	Mounting	Through-wall mounting, independent air duct
	Cooling Method	forced-air cooling
Environment	Operating Ambient Temperature	-10 °C~45 °C
	humidity	10%~90%RH(non-condensing)
	Storage temperature	-20 °C~65 °C
	Storage humidity	10%~90%RH(non-condensing)
	Altitude	Below 1000 m
	Protection Rating	Drive body: IP20; control cabinet protection: IP54
Compliance Standards	Certifications	CE , RoHS

4. Product Dimensions

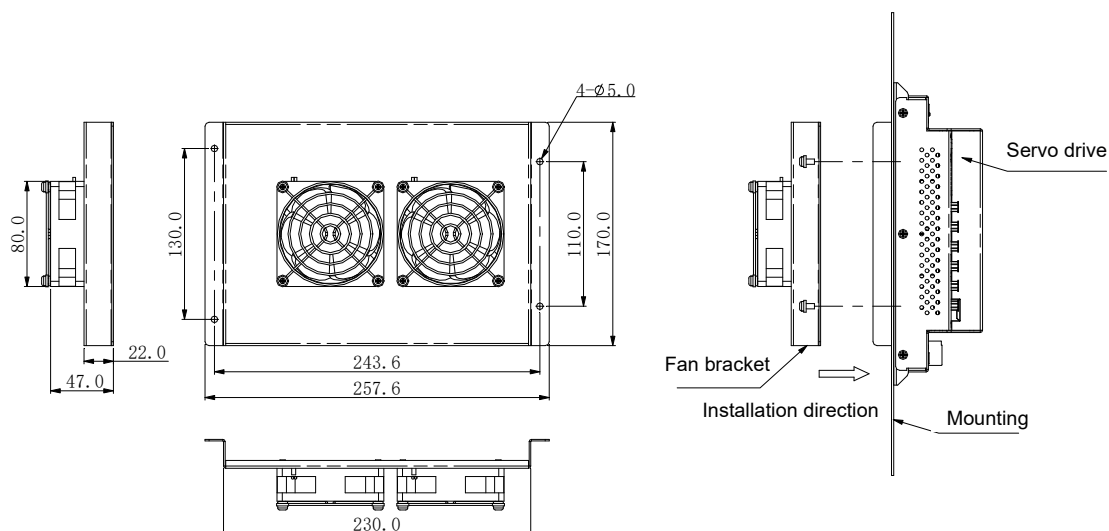
4.1 Dimension Drawing

R920-S6A05/ S6A08/ S5A05

External dimension drawing:

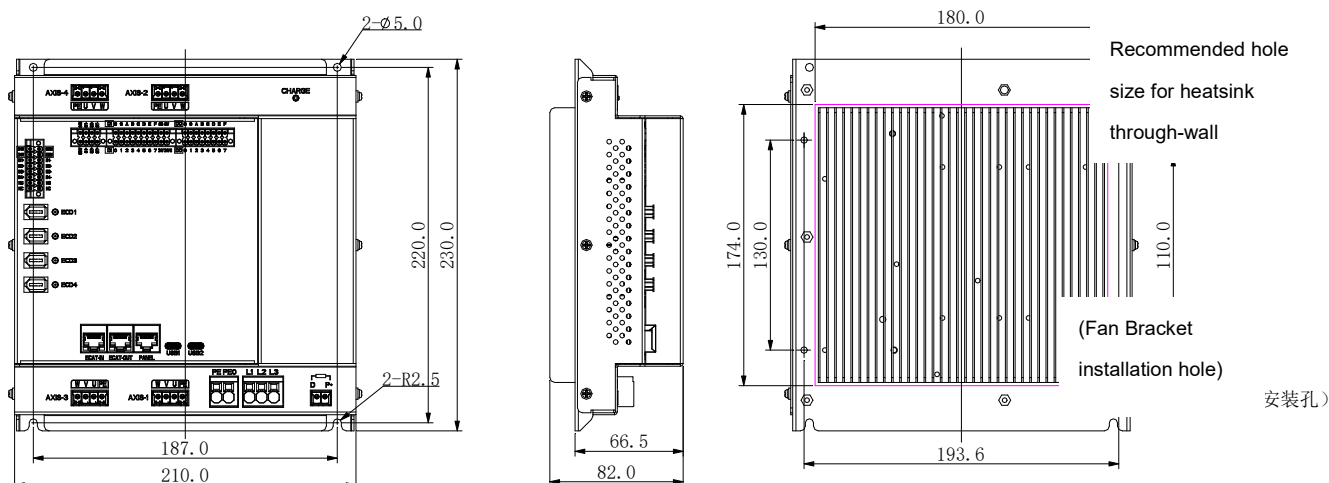


Fan Bracket Kit Dimensions(Optional accessory; purchase separately.Recommended fan model:8025,speed $\geq 3500\text{rpm}$):

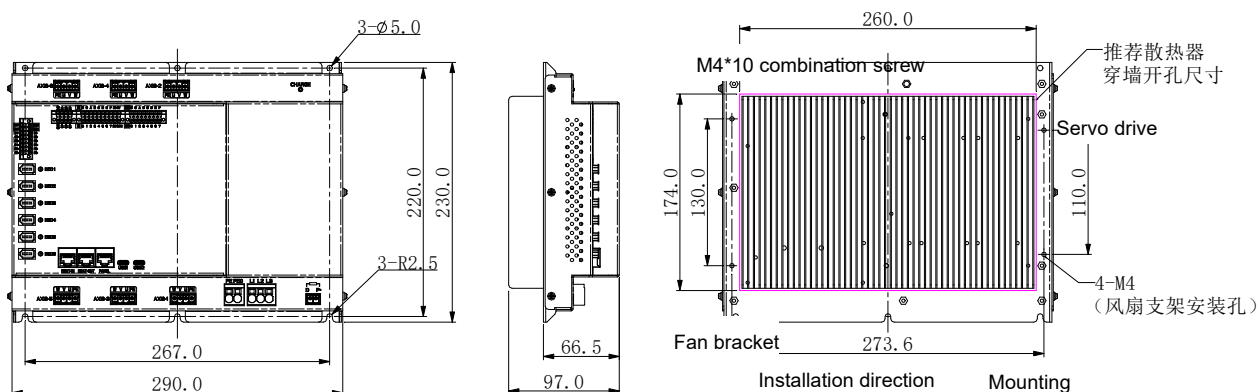


R920-S6A15/ S6B15/ S6C15

External dimension drawing:

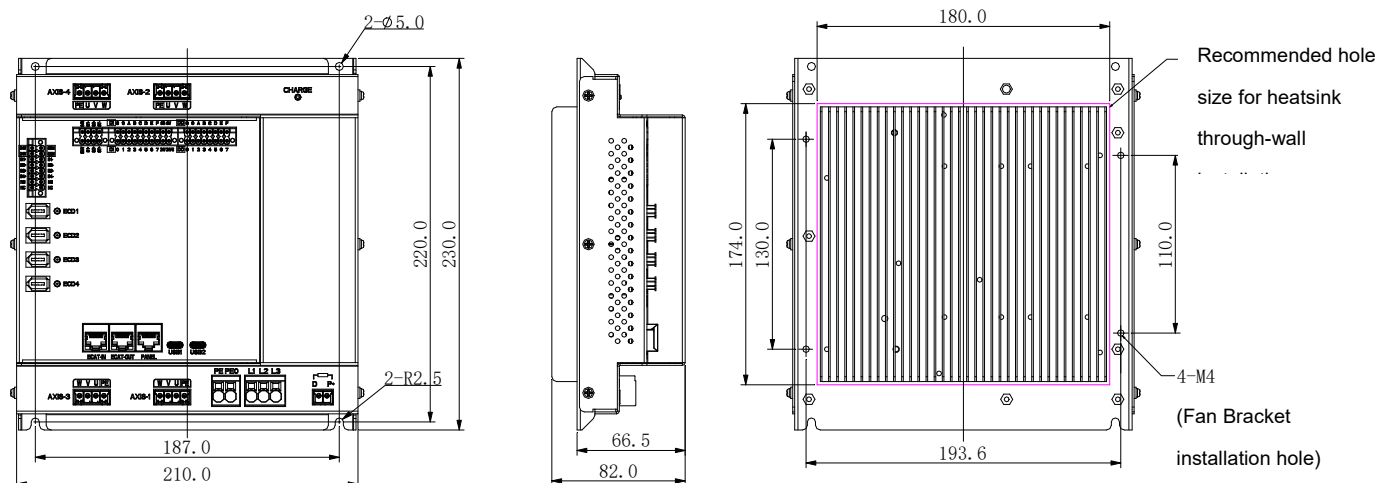


Fan Bracket Kit Dimensions(Optional accessory; purchase separately. Recommended fan model:8025,speed $\geq 3500\text{rpm}$):

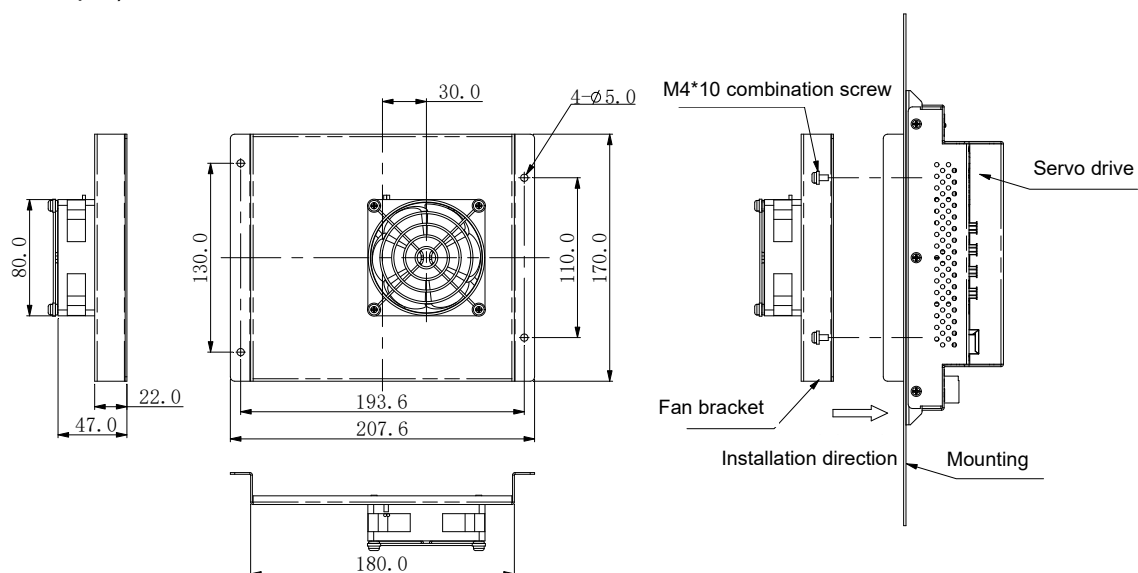


R920-S4A05/ S4A08/ S4B08/ S4C08

External dimension drawing:

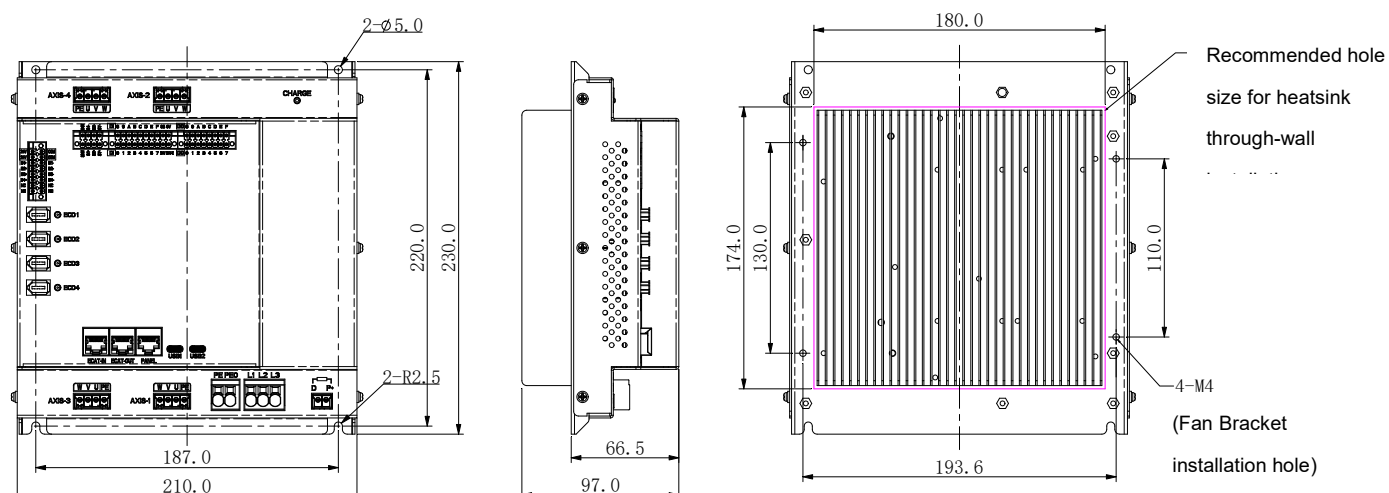


Fan Bracket Kit Dimensions(Optional accessory; purchase separately. Recommended fan model:8025,speed $\geq 3500\text{rpm}$):

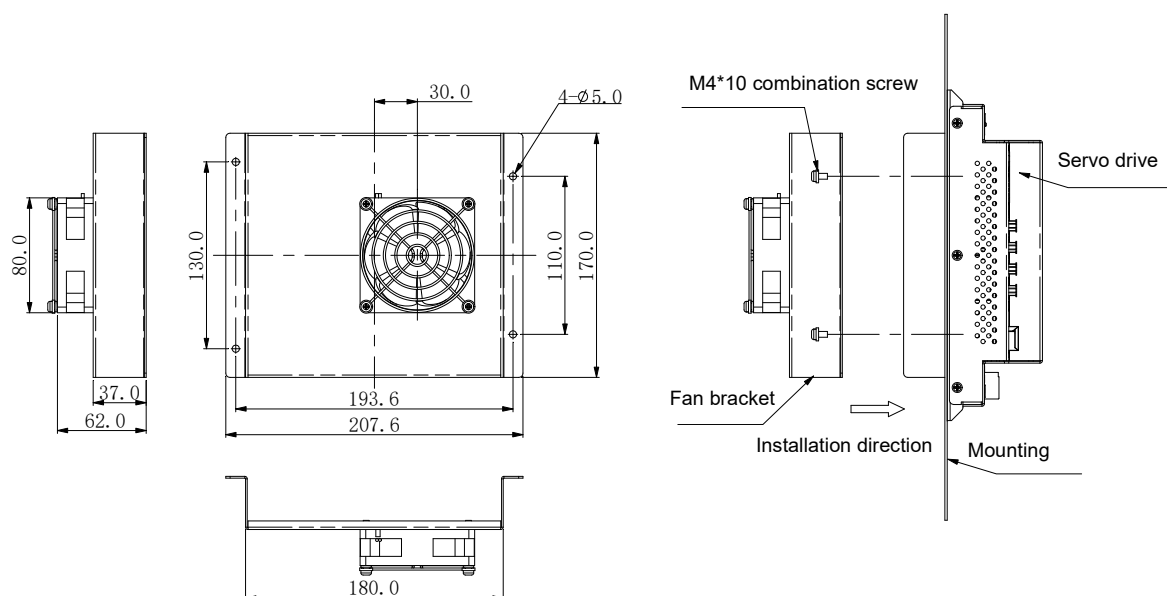


R920-S4A15/ S4B15/S4C15/S4D15

External dimension drawing:

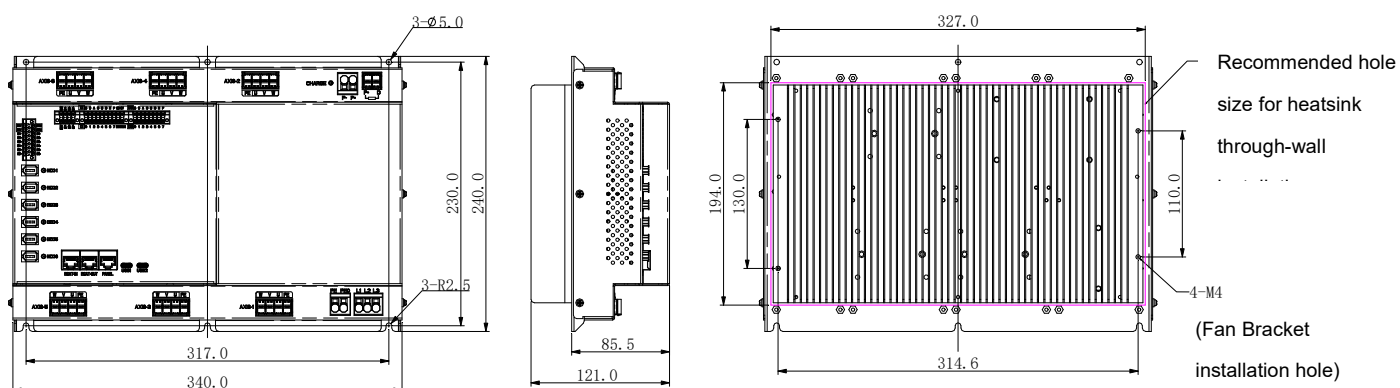


Fan Bracket Kit Dimensions(Optional accessory; purchase separately. Recommended fan model:8025,speed ≥ 3500 rpm):

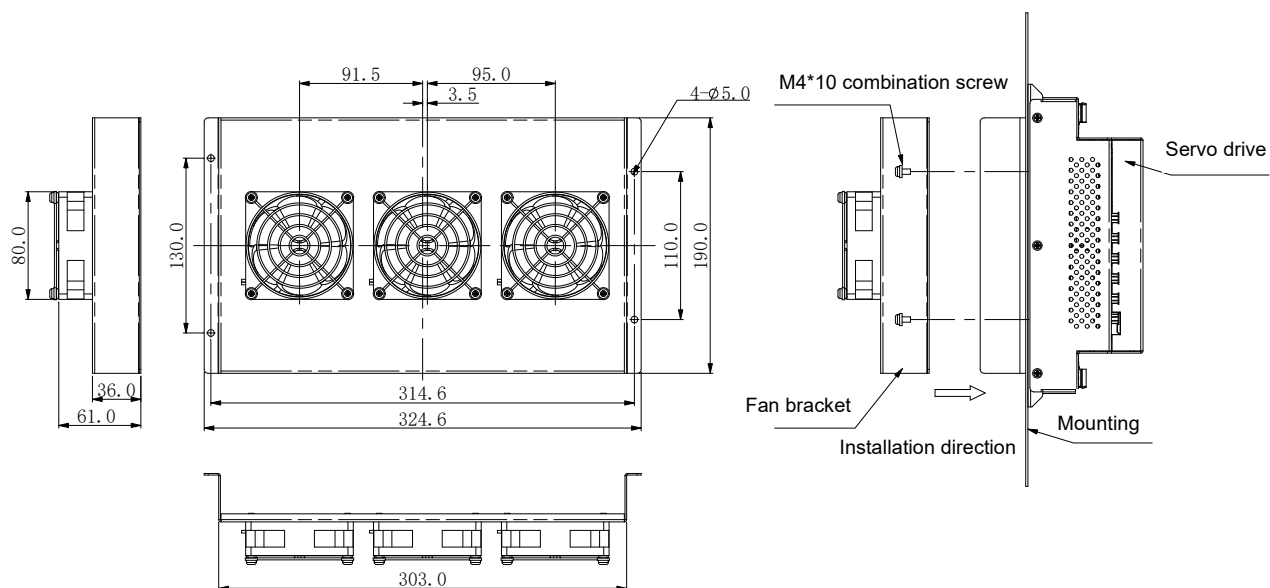


R920-T6C12/ T6D12 /T4 A12

External dimension drawing:

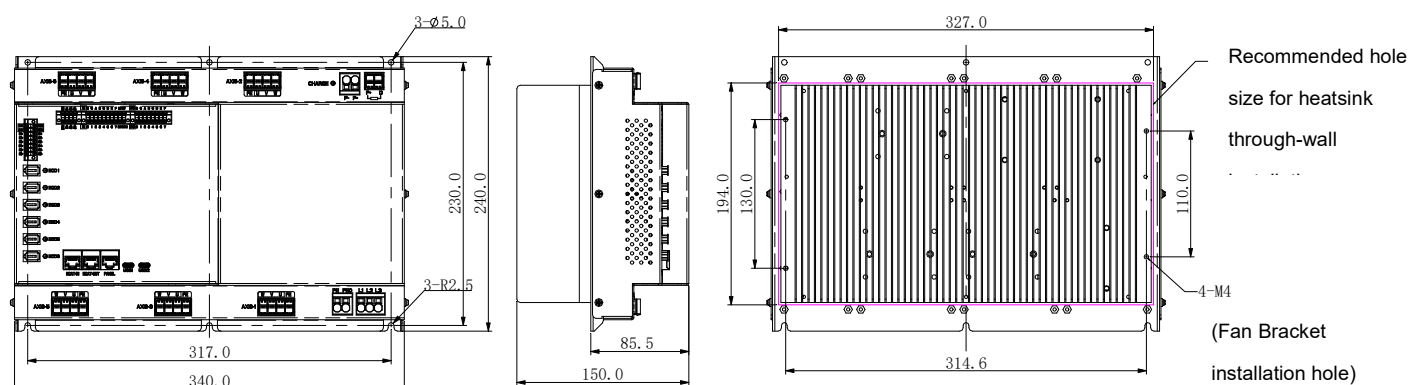


Fan Bracket Kit Dimensions(Optional accessory; purchase separately. Recommended fan model:8025,speed $\geq 3500\text{rpm}$):

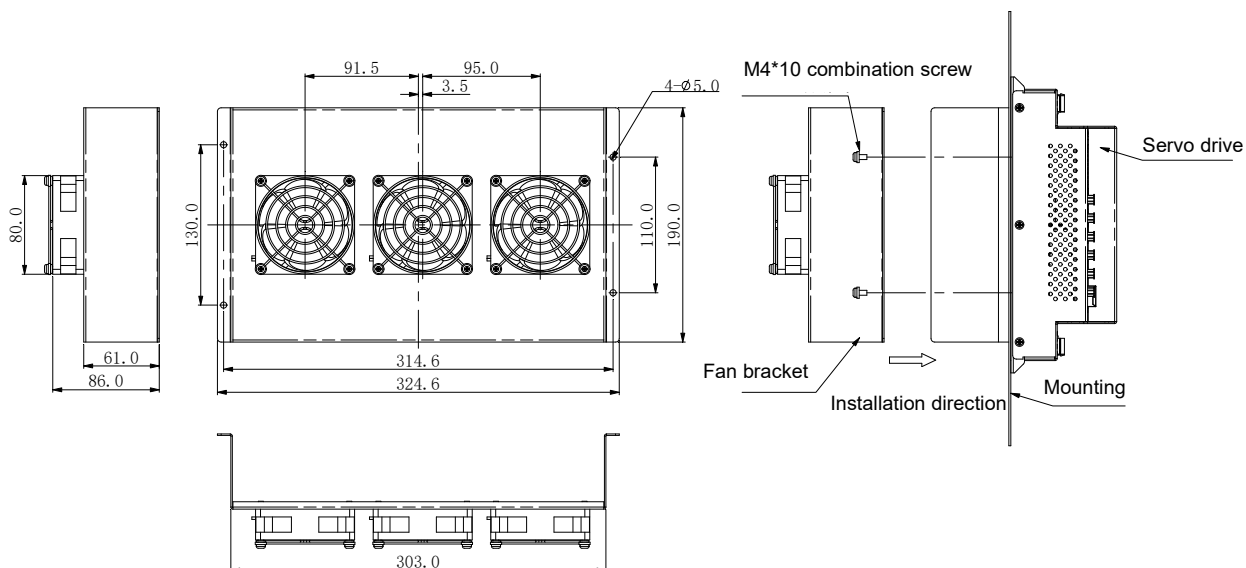


R920-T6A20 /T6B20 /T6C20 /T4 A20 /T4 B20 /T4 C20

External dimension drawing:

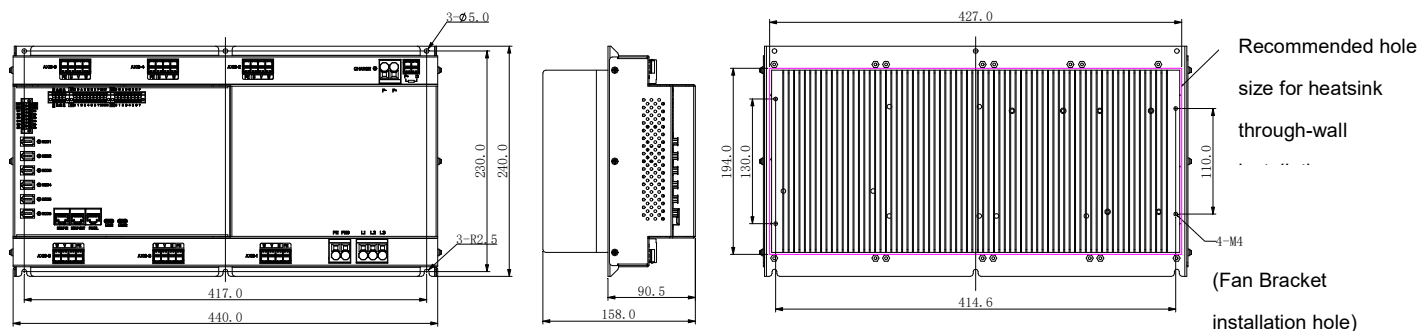


Fan Bracket Kit Dimensions(Optional accessory; purchase separately. Recommended fan model:8025,speed $\geq 3500\text{rpm}$):

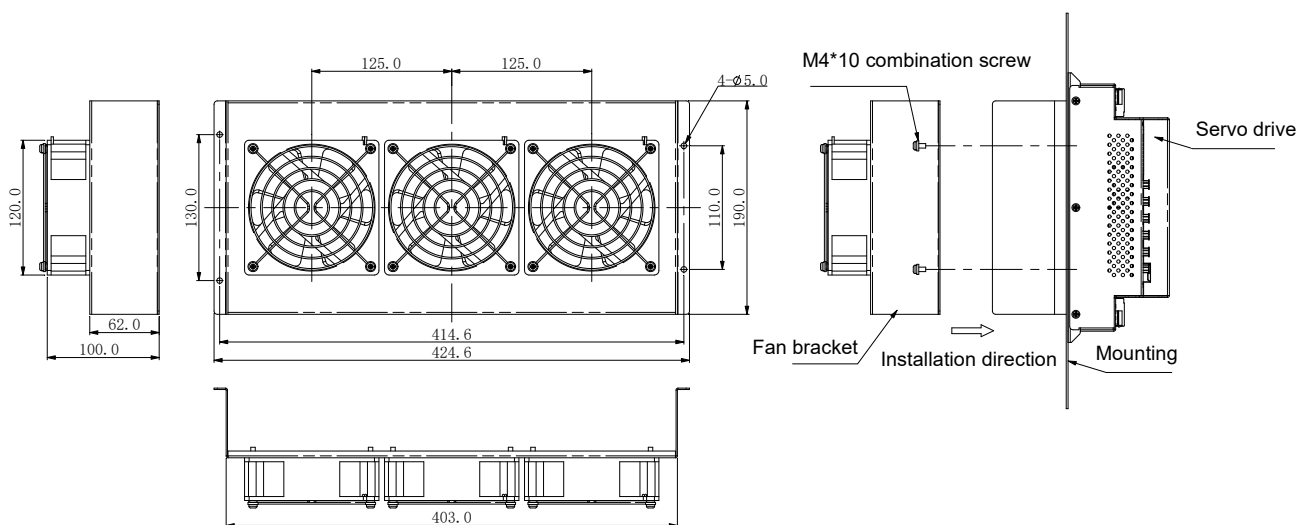


R920-T6A25/T6A35/T6B35

External dimension drawing:

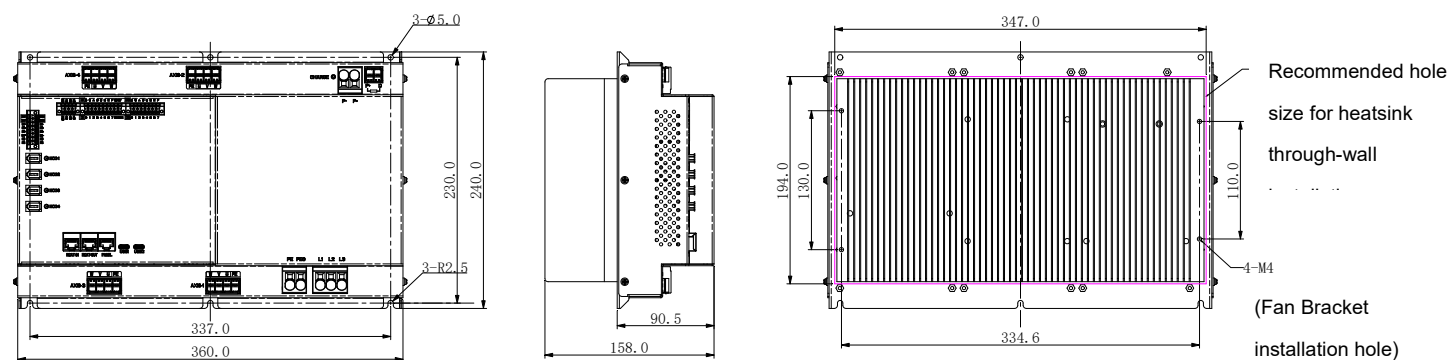


Fan Bracket Kit Dimensions(Optional accessory; purchase separately. Recommended fan model:12038,speed $\geq 3000\text{rpm}$):

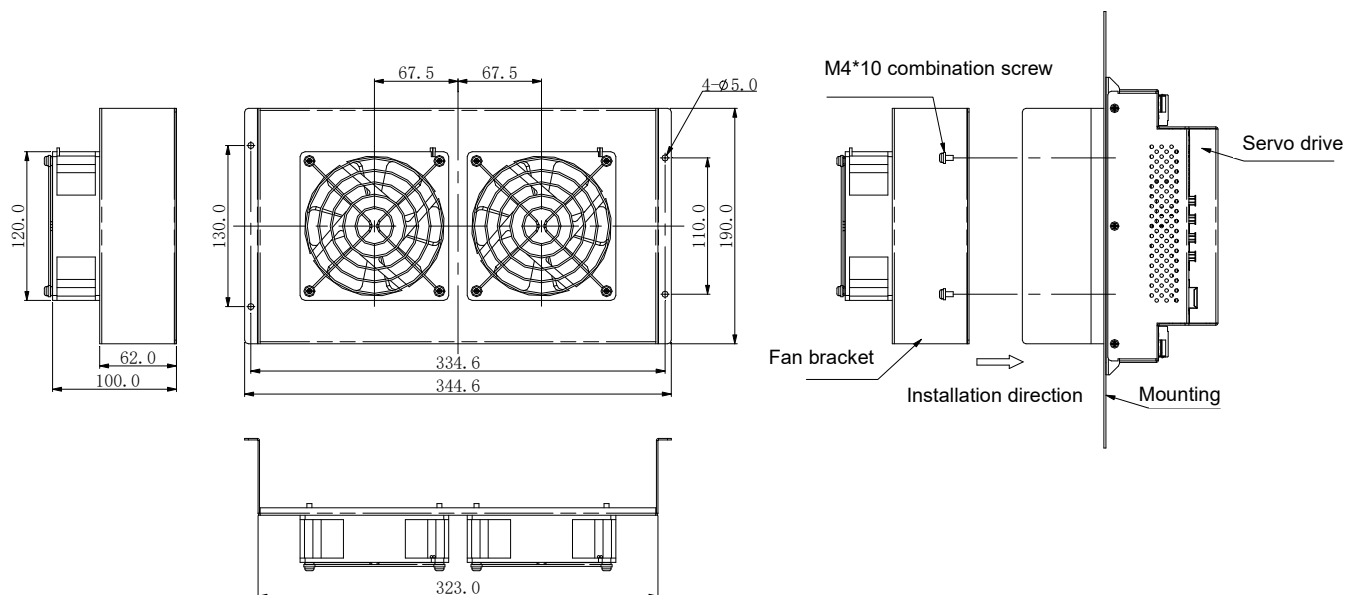


R920-T4A25/T4B25/ T4C25/ T4D25/ T4A35/ T4B35

External dimension drawing:

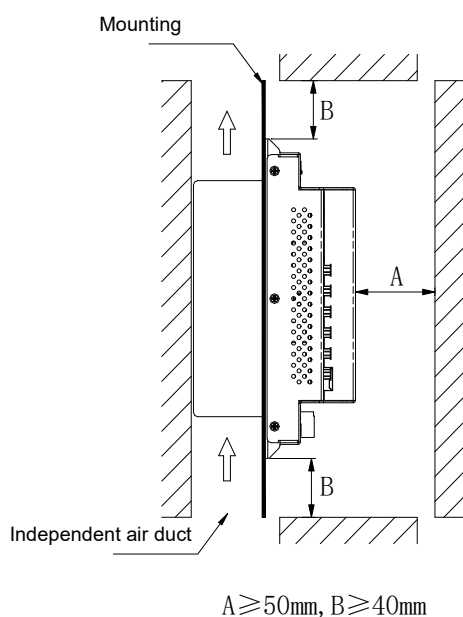


Fan Bracket Kit Dimensions(Optional accessory; purchase separately. Recommended fan model:12038,speed $\geq 3000\text{rpm}$):



4.2 Installation Direction and Space Requirements

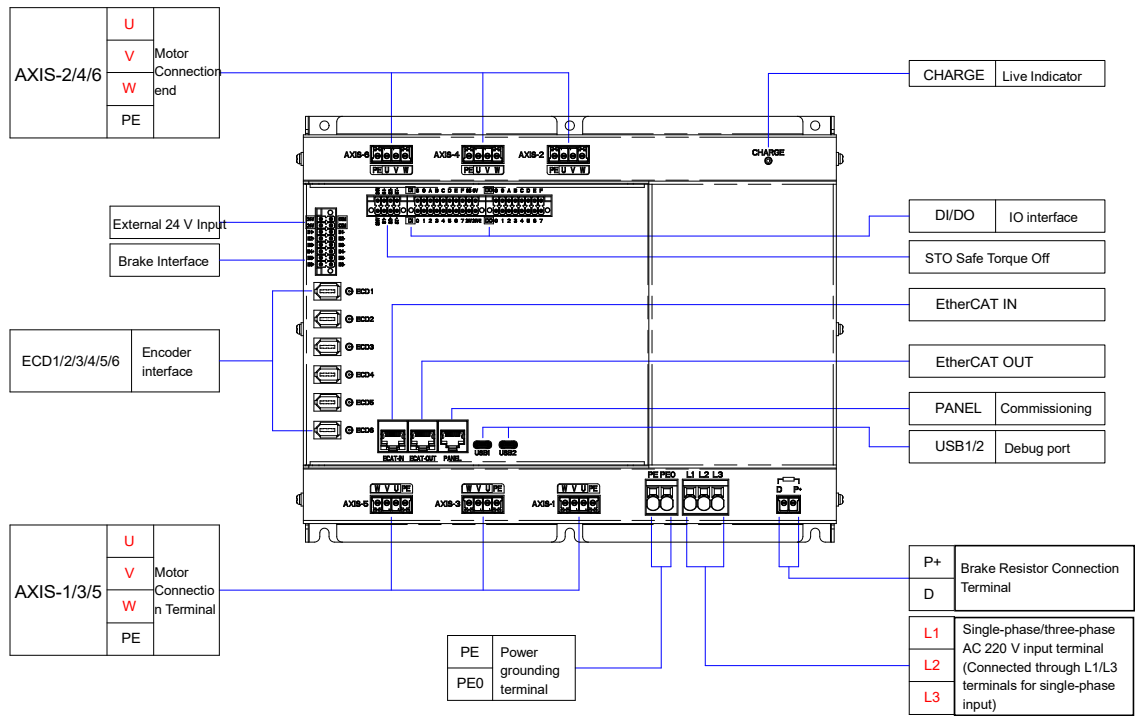
When installing servo drives in cabinets, vertical installation as shown below is recommended to ensure wiring and operating space inside the cabinet, independent cooling ducts, and good heat dissipation. If heat dissipation inside the cabinet is insufficient, use a cooling fan to maintain air circulation:



5. Wiring Instructions

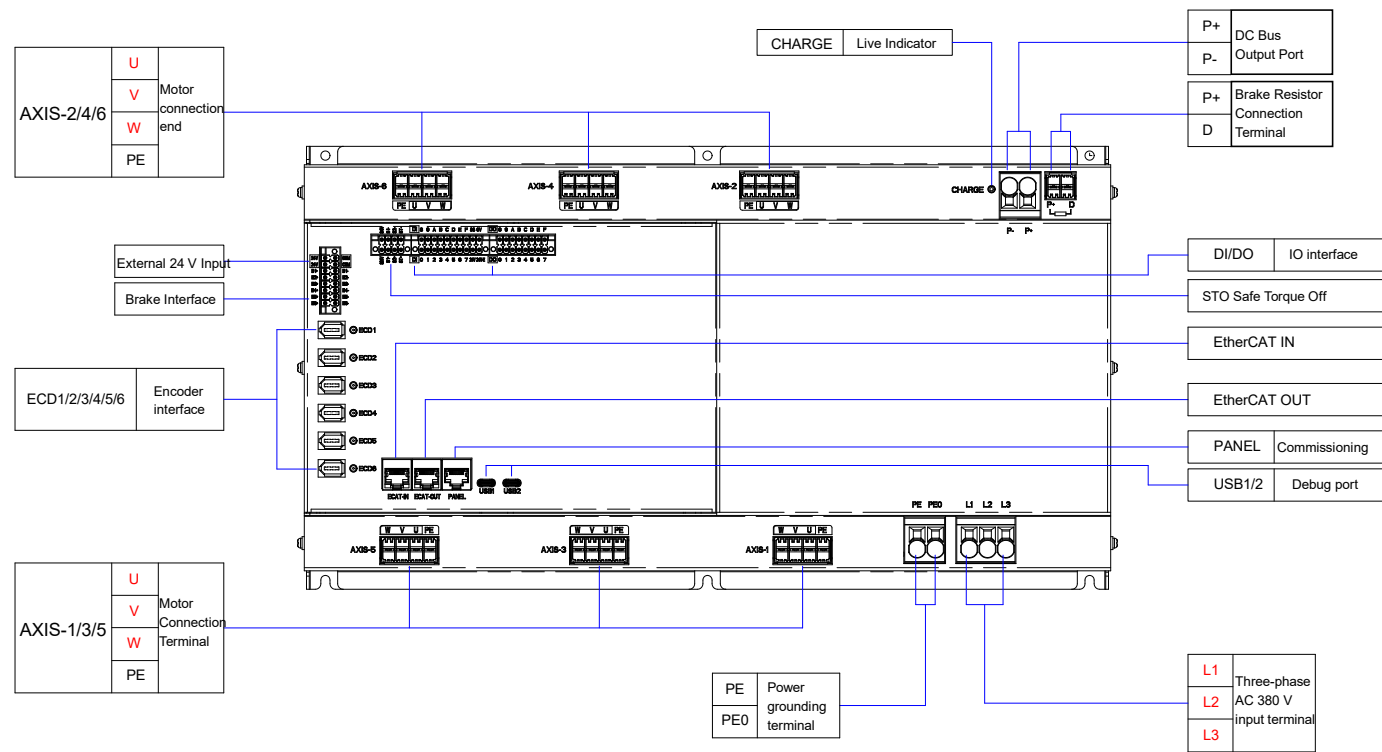
5.1 Terminal Definition

Applicable models:R920-S4xxx/R920-S5xxx/R920-S6xxx(Models such as AC 220 V)



Single-phase/three-phase AC 220 V models

Applicable models:R920-T4xxx/R920-T6xxx(Models such as AC 380 V)

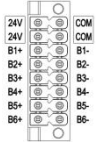


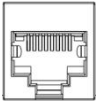
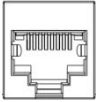
Three-phase AC 380 V models

5.2 Main Circuit Terminal Wiring Instructions

Terminal Label	Terminal Name	Function Description
P+	Brake Resistor Connection Terminal	Brake Resistor Connection Terminal: When the braking force is insufficient and an external braking resistor is needed, connect the braking resistor between P+ and D. Recommended Brake Resistor Resistance: ①R920-S4xxx/R920-S5xxx/R920-S6xxx recommended for models:20~30 R; ②R920-T6x12 recommended for models:25~50 R; ③R920-T4x25/R920-T6x25/R920-T6x35 recommended for models :12~25 R. Recommended Power Rating: 1/5 of the total motor power.
D		
PE	Grounding terminal	Motor grounding terminal.
U	Motor Connection Terminal	Connect servo motor:
V		Connect according to the corresponding UVW, otherwise it may
W		cause the motor to fail to rotate or run away.
L1	Three-phase power supply input terminal	AC 220 V model: Single-phase/three-phase AC220 V 50/60 Hz
L2		(When single-phase AC220 V is connected, it is connected through L1/L3 terminals);
L3		AC 380 V model: Three-phase AC 380 V 50/60 Hz.
PE	Power grounding terminal	During normal operation, PE and PE0 need to be short-circuited.
PE0		Note: When conducting equipment safety testing, disconnect the short circuit between drive PE and PE0.
P+	DC Bus Output Port (AC 380 V model)	Reserved for external shaft connection.
P-		
Warning	1、 Do not connect the input power cable to the U, V, W terminals on the output side, otherwise it will cause permanent damage to the driver! 2、 Do not connect the input power cable to the brake resistor (P+, D) input terminal, otherwise it will cause permanent damage to the driver!	

5.3 Control Circuit Terminal Wiring Instructions

Terminal Name	Function Description	Terminal View	Signal name	Pin number	Function Description
Brake Interface	Brake Control		24 V	/	24 V input
			24 V	/	24 V input
			COM	/	0 V input
			COM	/	0 V input
			B1+	/	Axis 1 motor brake control output
			B1-	/	
			B2+	/	Axis 2 motor brake control output
			B2-	/	
			B3+	/	Axis 3 motor brake control output
			B3-	/	
			B4+	/	Axis 4 motor brake control output
			B4-	/	
			B5+	/	Axis 5 motor brake control output
			B5-	/	
			B6+	/	Axis 6 motor brake control output
			B6-	/	
STO interface	STO Safe Torque Off		S24 V	/	STO 24 V power output
			S-0 V	/	STO 0 V power output
			S1+	/	STO input 1
			S1-	/	
			S2+	/	STO input 2
			S2-	/	
			ST+	/	STO action output
			ST-	/	
DI/DO	DI interface		0	/	Digital Input 0
			1	/	Digital Input 1
			2	/	Digital Input 2
			3	/	Digital Input 3
			4	/	Digital Input 4
			5	/	Digital Input 5
			6	/	Digital Input 6
			7	/	Digital Input 7
			24 V	/	Internal 24 V I/O power output
			24 V-E	/	External 24 V I/O power input
			8	/	Digital Input 8
			9	/	Digital Input 9
			A	/	Digital Input A

DI/DO	DI interface		B	/	Digital Input B
			C	/	Digital Input C
			D	/	Digital Input D
			E	/	Digital Input E
			F	/	Digital Input F
			SS	/	Common terminal for DI0-DIF
			0 V	/	I/O power supply 0 V
	DO interface		0	/	Digital Output 0
			1	/	Digital Output 1
			2	/	Digital Output 2
			3	/	Digital Output 3
			4	/	Digital Output 4
			5	/	Digital Output 5
			6	/	Digital Output 6
			7	/	Digital Output 7
			8	/	Digital Output 8
			9	/	Digital Output 9
			A	/	Digital Output A
			B	/	Digital Output B
			C	/	Digital Output C
			D	/	Digital Output D
			E	/	Digital Output E
			F	/	Digital Output F
CHARGE	Live Indicator	/	/	/	Indicator Light
ECAT-IN	EtherCAT input port Standard Ethernet Pin Definition		RJ45 standard network interface	1,2	Please use Category 5e or higher shielded twisted-pair Ethernet cable
				3,4	
				5,6	
				7,8	
				Shell	
ECAT-OUT	EtherCAT output port Standard Ethernet Pin Definition		RJ45 standard network interface	1,2	Please use Category 5e or higher shielded twisted-pair Ethernet cable
				3,4	
				5,6	
				7,8	
				Shell	

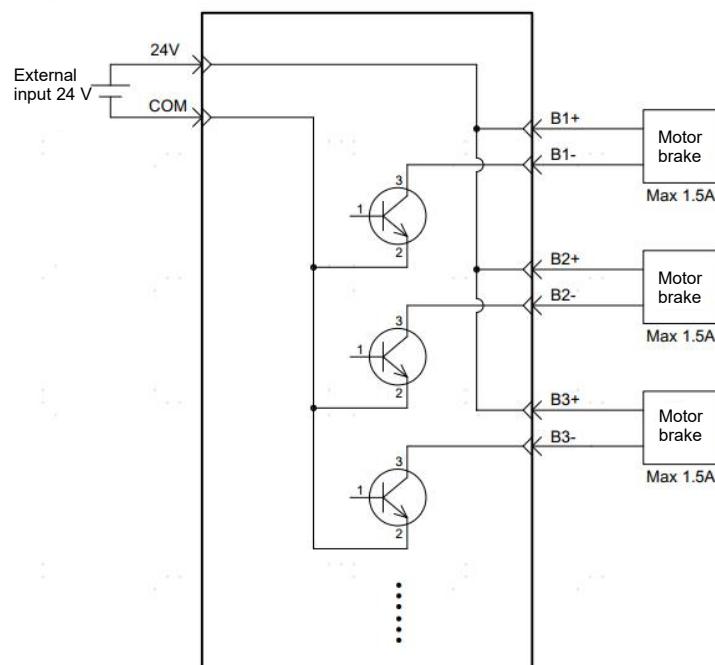
PANEL	Debugging		Internal	1,2	Keypad	commissioning
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	keyboard		commissioning interface	3,4	interface
				5,6	
				7,8	
				Shell	
ECD1~ ECD6	Encoder Interfaces for axes 1 to 6		+5 V	1	5 V power supply connection, requires twisted pair
			GND	2	
			--NC	3,4	Reserved pins
			Data+	5	Communication signal end, requires twisted pair
			Data-	6	
			FG	--	Shield connector housing
USB1	Commissioning Port		/	/	1/2/3 axis commissioning port
USB2	Commissioning Port		/	/	4/5/6 axis commissioning port

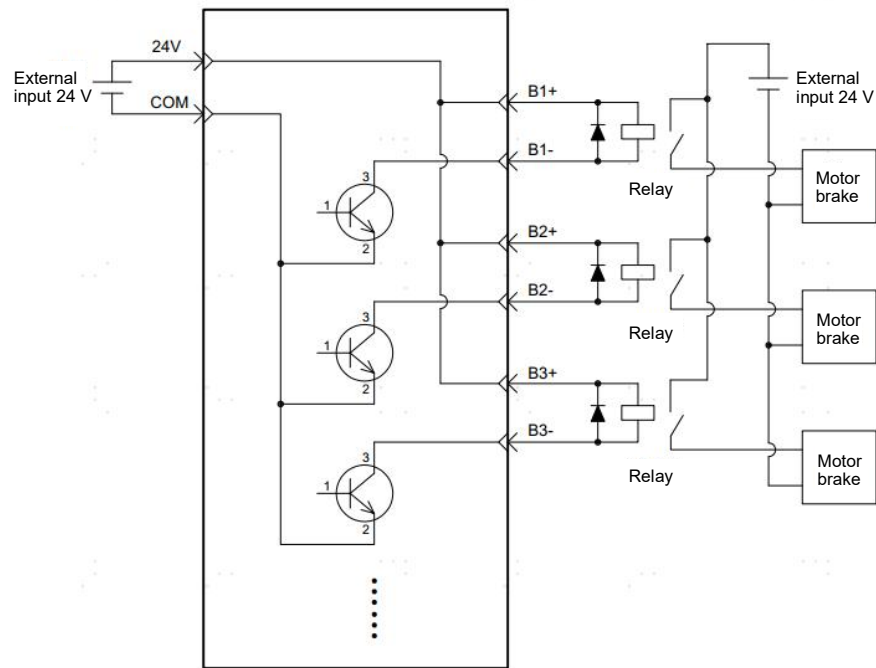
5.4 Control Circuit Wiring Instructions

5.4.1 Brake (Brake power supply connected to 24 V, COM, PE)

- When the output current of the brake control is ≤ 1.5 A, directly use B1, B2, B3... to output control the motor brake:

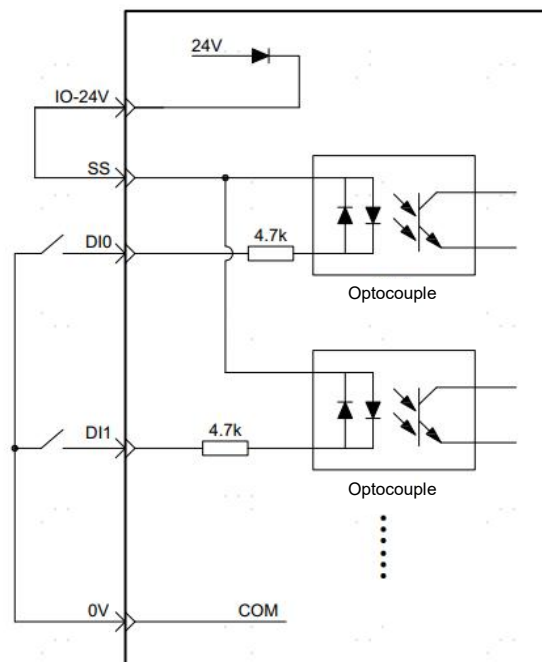


- When the output current of the brake control is greater than 1.5 A, the motor brake is controlled by a relay:



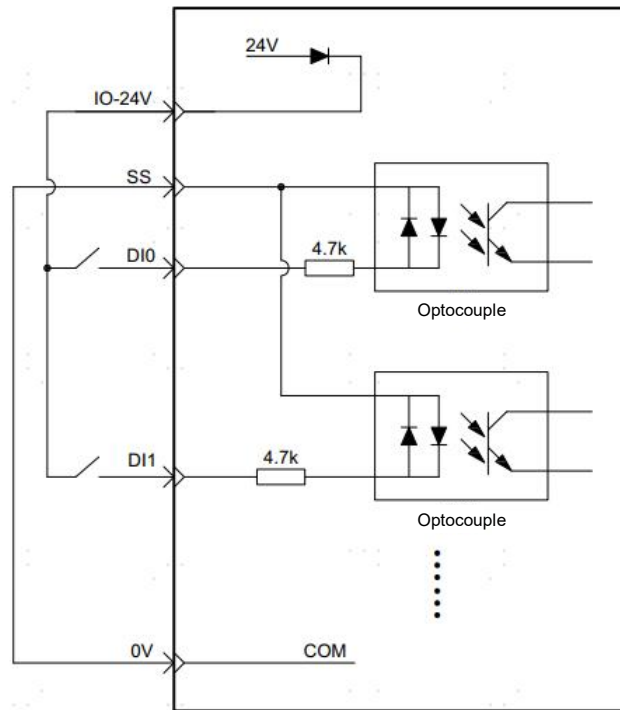
5.4.2 DI terminal wiring

- NPN connection method



NPN input

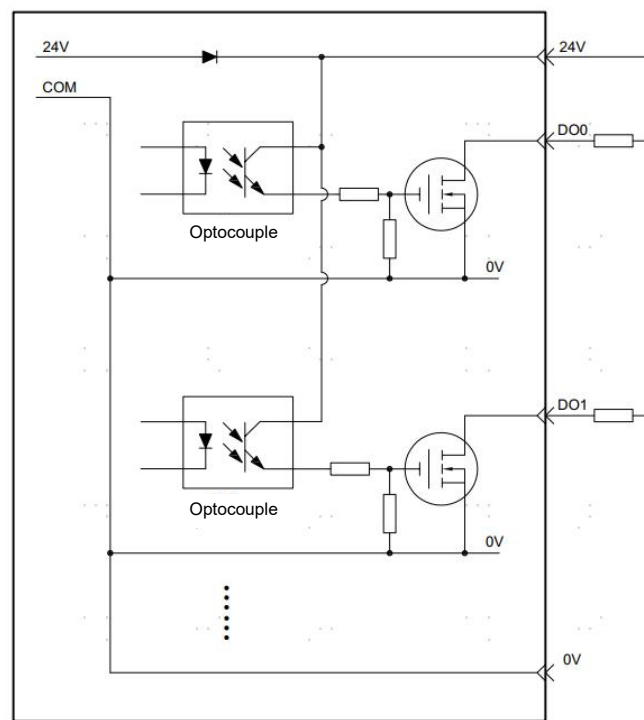
➤ PNP connection method



PNP input

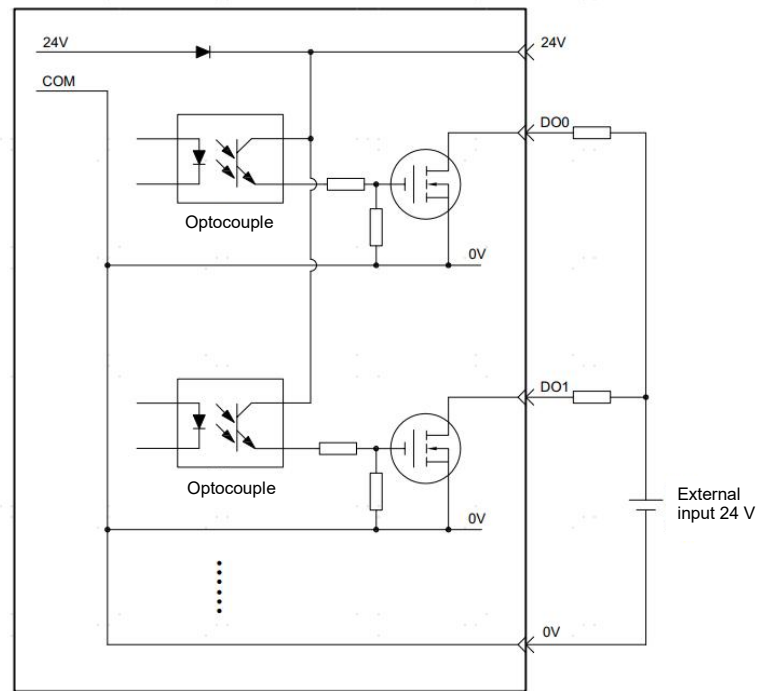
5.4.3 DO terminal wiring

➤ When the total current is ≤ 4 A



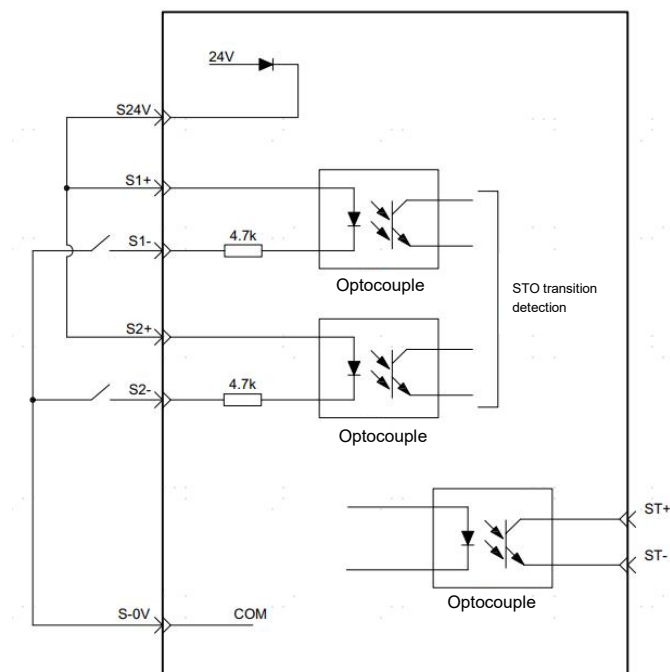
NPN output (total current ≤ 4 A)

- When the total current is $>4\text{ A}$



PNP output (total current $>4\text{ A}$)

5.4.4 STO wiring



6. Function Codes

6.1 Function Code List

6.1.1 Parameter and Attribute Definitions

Function Group	Function Description	Quantity	Width
P0	Basic Parameter Group	100	16 bit
P1	Advanced Commissioning Parameters	100	
P2	Motor Parameter Group	100	
P3	Function Parameter Group	100	
d0	Monitoring Parameter Group	100	
ErrCode	Alarm Code and Description	100	

Function Code Attribute 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 factory settings and retain the original value
H	Hexadecimal parameters, modified bit by bit	☆	Related to the driver model
-	Signed	※	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	S	Speed control
▲	Do not save parameter values after power-off	T	Torque control

6.1.2 Drive Module Axis 1 Servo Parameter Group

6.1.2.1 Basic Parameter Group

P0 group		Basic Parameter Group							
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated Mode
P0-00	20000	0 x2000:01	Software version	Software version	0~65535		1000	R	
P0-01	20001	0 x2000:02	Driver model	4:S5R0(5 A) 220 V 5:S8R0(8 A) 220 V 6:S015(15 A) 220 V 7:T6R0(6 A) 380 V 8:T8R5(8.5 A) 380 V 9:T12 R(12 A) 380 V 10:T20 R(20 A) 380 V 11:T25 R(25 A) 380 V 12:T35 R(35 A) 380 V	4~12		4	■	
P0-02	20002	0 x2000:03	Motor code	Motor ID:1000~3500	1000~3500		1400	■	
P0-03	20003	0 x2000:04	Parameter management	Units and tens: Reserved Hundreds: Restore factory parameters 0:no action 1:Restore factory Settings (automatically reset to zero upon completion) Thousands: Reserved	0 x0000~ 0 x1111		0 x0000	H/■	P. S.T
P0-04	20004	0 x2000:05	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	0 x2000:06	Maximum speed threshold	0~6000	0~6000	rpm	4500		
P0-06	20006	0 x2000:07	Forward maximum torque limit	0~300	0~300	%	300		
P0-07	20007	0 x2000:08	Reverse maximum torque limit	0~300	0~300	%	300		
P0-08	20008	0 x2000:09	Motor direction logic	0: CCW direction is the positive rotation direction 1: CW direction is the positive rotation direction	0~1		0	■	
P0-09	20009	0 x2000:10	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: Enable Overspeed Alarm 1:Disable Overspeed Alarm Hundreds: 0:EtherCAT speed	0 x0000~ 0 x2113		0 x1100		

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated Mode
				unit selected in rpm 1:EtherCAT speed unit selected in pp/s Thousands:Motor code recognition 0:Disable automatic motor code recognition 1:Enable automatic motor code recognition 2:Write the motor code into the motor					
P0-10	20010	0 x2000:11	Control Mode	0:TRQ 1:SPD 2:POS 3:EtherCAT	0~13		0		PS
P0-11	20011	0 x2000:12	Brake ON delay time	Delay Time from Servo-On Command to Brake Engagement	100~500	ms	100	■	P. S.T
P0-12	20012	0 x2000:13	Stationary state, brake OFF-servo OFF delay	Delay Time from Servo-Off Command to Motor Power-Off	1~1000	ms	100	■	P. S.T
P0-13	20013	0 x2000:14	Reserved						
P0-14	20014	0 x2000:15	Reserved						
P0-15	20015	0 x2000:16	Overload protection coefficient of motor	10~100	10~100	%	50		
P0-16	20016	0 x2000:17	USB monitoring settings	Units:USB low-speed monitoring sampling interval, unit ms (0-5) Tens:USB monitoring mode setting 0:Turn off monitoring 1:Low speed monitoring 2:High speed monitoring, sampling frequency 8k 3:High speed monitoring, sampling frequency 16k Hundreds:Reserved Thousands: Reserved	0 x0000~ 0 x0035		0 x0000	H/■	P. S.T
P0-17	20017	0 x2000:18	The keyboard enables control of characters	0:Servo OFF 1:Servo ON	0~1		0	■	
P0-18	20018	0 x2000:19	External emergency stop control	Units:External emergency stop alarm detection enable 0:Do not detect external emergency stop signals 1:Detecting external emergency stop signals Tens:Associated alarm enable 0:Do not enable associated alarm	0 x0000~ 0 x0011		0	■	

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated Mode
				1:Enable associated alarm					
P0-19	20019	0 x2000:20	Reserved						
P0-20	20020	0 x2000:21	Load inertia ratio	The ratio of load inertia to motor inertia	0~3000	%	100		S
P0-21	20021	0 x2000:22	Speed loop gain	The larger the response, the faster it will be, and if it is too large, it will cause vibration The position mode and position loop gain are adjusted in coordination	20~20000	0.1 Hz	800		S
P0-22	20022	0 x2000:23	The integral time constant of the velocity loop	The larger the integral, the stronger the integration effect, and the stronger the speed tracking ability, which needs to be coordinated with the speed loop gain and position loop gain	0~20000	0.1 Hz	10		S
P0-23	20023	0 x2000:24	Position loop gain	The larger the response, the faster it will be, and if it is too large, it will cause vibration The position mode and position loop gain are adjusted in coordination	20~20000	0.1 Hz	200		P
P0-24	20024	0 x2000:25	Second speed loop gain	The larger the response, the faster it will be, and if it is too large, it will cause vibration The position mode and position loop gain are adjusted in coordination	20~20000	0.1 Hz	800		S
P0-25	20025	0 x2000:26	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 speed loop gain and position loop gain	20~1000.0	0.1 Hz	125		S
P0-26	20026	0 x2000:27	Second position loop gain	The larger the response, the faster it will be, and if it is too large, it will cause vibration The position mode and position loop gain are adjusted in coordination	20~2000.0	0.1 Hz	200		P
P0-27	20027	0 x2000:28	Speed feedforward selection	Units:Speed feedforward selection 0:Internal speed feedforward(P0-28) 1:External given	0 x0000~ 0 x1111		0 x0000	■	P

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated Mode
				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					
P0-28	20028	0 x2000:29	Speed feedforward gain	Increasing can reduce the steady-state position deviation, but if it is too large, it can lead to overshoot	0~100	%	0		P
P0-29	20029	0 x2000:30	Speed feedforward smoothing filter constant	Smooth the velocity feedforward quantity and adjust it in coordination with the velocity feedforward gain	0~64.0	ms	0		P
P0-30	20030	0 x2000:31	Reserved	Reserved	50~1000		100		P
P0-31	20031	0 x2000:32	DI1 function	Units&tens: 00~05:Reserved 08:Emergency stop 09:Axis 1 origin switch 0 A:Axis 2 origin switch 0 B:Axis 3 origin switch 0 C:Axis 1 positive limit 0 D:Axis 2 positive limit 0 E:Axis 3 positive limit 0 F: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	0 x0000~ 0 x0117		000 C		
P0-32	20032	0 x2000:33	DI2 function	Same as P0-31	0 x0000~ 0 x0117		000 F		

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated Mode
P0-33	20033	0 x2000:34	DI3 function	Same as P0-31	0 x0000~ 0 x0117		0009		
P0-34	20034	0 x2000:35	DI4 function	Same as P0-31	0 x0000~ 0 x0117		0012		
P0-35	20035	0 x2000:36	DI5 function	Same as P0-31	0 x0000~ 0 x0117		0015		
P0-36	20036	0 x2000:37	Reserved	Reserved					
P0-37	20037	0 x2000:38	DI filtering time(DI1~DI6)	0~32 ms	0~32		0		
P0-38	20038	0 x2000:39	Electronic gear selection	0:Set value using object dictionary 0x6091 1:Use the values of P0-39(high bits) and P0-40 (low bits)	0~1		0		
P0-39	20039	0 x2000:40	Number of position command pulses corresponding to one rotation of the motor (high position)	0~20000	0~ 20000		838	■	P
P0-40	20040	0 x2000:41	Number of position command pulses corresponding to one rotation of the motor (low position)	0~9999 Pulse per revolution=(P0-39)*10000+(P0-40)	0~9999		8608	■	P
P0-41	20041	0 x2000:42	Moving average filter constant	--	0~ 200.0	ms	0		P
P0-42	20042	0 x2000:43	First order low-pass filter constant	--	0~ 6000.0	ms	0		P
P0-43	20043	0 x2000:44	Reserved	--	0~ 65535		0	L	P
P0-44	20044	0 x2000:45	Reserved	--	0~ 16384		2		
P0-45	20045	0 x2000:46	Reserved	--	0~ 65535		10000	L	P
P0-46	20046	0 x2000:47	Reserved	--	0~ 16384		0		
P0-47	20047	0 x2000:48	Reserved	--	4~ 16384		2500	■	P
P0-48	20048	0 x2000:49	Reserved	--	0 x0000~ 0 x0001		0 x0000	H/■	P
P0-49	20049	0 x2000:50	Position deviation limit	0.1~50.0 turns	0.1~ 50.0		10.0	■	
P0-50	20050	0 x2000:51	EtherCAT synchronization cycle	1~256 (x0.125 ms)=[0.125 ms~32 ms]	1~256	0.1 25/ ms	8		
P0-51	20051	0 x2000:52	Quadrant Protuberance CCW Compensation Value	0~1000‰	0~1000		0		
P0-52	20052	0 x2000:53	Quadrant Protuberance CW Compensation Value	0~1000‰	0~1000		0		

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated Mode
P0-53	20053	0 x2000:54	Quadrant Protuberance Compensation Delay Time	0~1000 ms	0~1000		0		
P0-54	20054	0 x2000:55	Quadrant Protuberance Compensation Filtering	0~100 ms	0~100		0		
P0-55	20055	0 x2000:56	Gravity compensation value	0~1000‰	0~1000		0		
P0-56	20056	0 x2000:57	Gravity compensation polarity	0: CCW direction compensation 1: CW direction compensation	0~1		0		
P0-57	20057	0 x2000:58	Notch filter frequency	10-5000 Hz	10~5000		100		
P0-58	20058	0 x2000:59	Notch filter depth	0~20	0~20		10		
P0-59	20059	0 x2000:60	Notch filter gain	0~500%	0~500		0		
P0-60	20060	0 x2000:61	Zero offset of the magnetic pole	0~2048,<<12	0~2048		253		
P0-61	20061	0 x2000:62	Speed command (for debugging)	Speed command reference set by Pn parameter	0~4500	rpm	100		
P0-62~P0-64	20062~20064	0 x2000:63~0 x2000:65	Reserved						
P0-65	20065	0 x2000:66	Ud-Kp	130	0~800		50		
P0-66	20066	0 x2000:67	Ud-Ki	25	0~500		25		
P0-67	20067	0 x2000:68	Uq-Kp	130	0~300		50		
P0-68	20068	0 x2000:69	Uq-Ki	25	0~300		25		
P0-69	20069	0 x2000:70	Reserved						
P0-70	20070	0 x2000:71	Speed command polarity	0~1	0~1		0		
P0-71	20071	0 x2000:72	Servo adaptive rigidity	20~20000(Prevent noddling phenomenon during the enabling process under gravity or load conditions	20~20000		1200	▲	
P0-72	20072	0 x2000:73	The first set of gain speed inflection points	/	0~6000	rpm	6000		
P0-73	20073	0 x2000:74	The second set of gain speed inflection points	/	0~6000	rpm	6000		
P0-74~P0-79	20074~20079	0 x2000:75~0 x2000:80	Reserved						
P0-80	20080	0 x2000:81	One-click Aging Parameters		0~6		0		
P0-81	20081	0 x2000:82	Internal function switch	Units:DC Bus Voltage Linked Adjustment Enable 0:Close 1:Enable Tens:Dead zone compensation enable 0:Close 1:Enable Hundreds:Peak current suppression 0:Close	0 x0000~0 x111		0 x0000	H	P. S.T

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated Mode
				1:Enable Thousands: Reserved 0:Normal mode					
P0-82	20082	0 x2000:83	Manufacturer calibration mode	Units:Manufacturer's current calibration mode 0:Close 1:Enable,The motor is only used for internal calibration by the manufacturer others:Reserved	0 x0000~ 0 x0001		0 x0000	H	PST
P0-83	20083	0 x2000:84	Reserved						
P0-84	20084	0 x2000:85	VDC calibration	27800~37683	27800~ 37683		27800	K	P. S.T
P0-85	20085	0 x2000:86	High position of serial number (first test year)	2015~2029	2015~ 2029		2017	K	P. S.T
P0-86	20086	0 x2000:87	Median of serial number (first test month day)	0101~1231	0101~ 1231		907	K	P. S.T
P0-87	20087	0 x2000:88	Low position of serial number (first test serial number)	0 x0000~0xFFFF	0 x0000~ 0 xFFFF		0 x0000	H/K	P. S.T
P0-88	20088	0 x2000:89	Single-board tooling test QC label	0 xA7E3:Pass Others:NG	0 x0000~ 0 xFFFF		0 x0000	H/K	P. S.T
P0-89	20089	0 x2000:90	Pre-aging QC test label	0 x8F68:Pass Others:NG	0 x0000~ 0 xFFFF		0 x0000	H/K	P. S.T
P0-90	20090	0 x2000:91	12-hour aging test label	0 x5A5 A:Pass Others:NG	0 x0000~ 0 xFFFF		0 x0000	H/K	P. S.T
P0-91	20091	0 x2000:92	Post-aging final test label	0 xB80F:Pass Others:NG	0 x0000~ 0 xFFFF		0 x0000	H/K	P. S.T
P0-92	20092	0 x2000:93	Function Password	E5DA:Clear the multi-turn values of the encoder	0 x0000~ 0 xFFFF		0 x0000	H/K	P. S.T
P0-93	20093	0 x2000:94	Reserved						
P0-94	20094	0 x2000:95	Reserved	Reserved					
P0-95	20095	0 x2000:96	Reserved	Reserved	0 x0000~ 0 xFFFF		0 x0000	H/K	P. S.T
P0-96	20096	0 x2000:97	Reserved	Reserved	0 x0000~ 0 xFFFF		0 x0000	H/R/K	P. S.T
P0-97	20097	0 x2000:98	Reserved	Reserved	0 x0000~ 0 xFFFF		0 x0000	H/R/K	P. S.T
P0-98	20098	0 x2000:99	Reserved	Reserved	0 x0000~ 0 xFFFF		0 x0000	H/R/K	P. S.T
P0-99	20099	0 x2000:100	Reserved	Reserved	0 x0000~ 0 xFFFF		0 x0000	H/K	

6.1.2.2 Advanced Commissioning Parameter Group

P1 group	Advanced Commissioning Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated Mode
P1-00	20100	0 x2001:01	Self-Tuning Mode	0:Manual adjustment 1:Rigidity grade adjustment 2:Position loop bandwidth + inertia self-tuning (slow change) 3:Position loop bandwidth + inertia self-tuning (rapid change)	0~3		0		
P1-01	20101	0 x2001:02	Rigidity grade	Rigidity grade setting	1~32		12		
P1-02	20102	0 x2001:03	Reserved	Reserved	0~65535		0		
P1-03	20103	0 x2001:04	Inertia Identification mode	0:Internal instruction round-trip motion mode 1:Controller command mode 2:Continuous automatic recognition	0~2		0		
P1-04	20104	0 x2001:05	Inertia Identification completion mark	0:Inertia Identification is not completed 1:The inertia identification has been completed	0~1		0		
P1-05	20105	0 x2001:06	Max Speed for Inertia Identification	Inertia Identification allows for the maximum operating speed	300~3000	rpm	1000		
P1-06	20106	0 x2001:07	Inertia Identification Acceleration Time	The time it takes for the inertia identification speed to accelerate from 0 to 5000 rpm	10~30000	ms	100		
P1-07	20107	0 x2001:08	Maximum Movement Revolutions for Inertia Identification	Permitted Travel Revolutions for Inertia Identification	1~50	r	5		
P1-08	20108	0 x2001:09	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	0 x2001:10~0 x2001:15	Reserved	Reserved	0~65535		0		
P1-15	20115	0 x2001:16	Vibration detection threshold	Vibration detection threshold	0~100		100		
P1-16	20116	0 x2001:17	Vibration detection time	Vibration detection time	0~100		50		
P1-17	20117	0 x2001:18	Frequency of the first notch filter	Notch filter frequency	10~5000		5000		
P1-18	20118	0 x2001:19	Width of the first notch filter	Notch filter width	0~100		2		
P1-19	20119	0 x2001:20	Depth of the first notch filter	Notch filter depth	0~100		0		
P1-20	20120	0 x2001:21	Frequency of the second notch filter	Notch filter frequency	0~65535		5000		

P1 group	Advanced Commissioning Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated Mode
P1-21	20121	0 x2001:22	Width of the second notch filter	Notch filter width	0~65535		2		
P1-22	20122	0 x2001:23	Depth of the second notch filter	Notch filter depth	0~65535		0		
P1-23	20123	0 x2001:24	Frequency of the third notch filter	Notch filter frequency	0~65535		5000		
P1-24	20124	0 x2001:25	Width of the third notch filter	Notch filter width	0~65535		2		
P1-25	20125	0 x2001:26	Depth of the third notch filter	Notch filter depth	0~65535		0		P
P1-26	20126	0 x2001:27	Frequency of the fourth notch filter	Notch filter frequency	0~65535		5000		P
P1-27	20127	0 x2001:28	Width of the fourth notch filter	Notch filter width	0~65535		2		P
P1-28	20128	0 x2001:29	Depth of the fourth notch filter	Notch filter depth	0~65535		0		
P1-29	20129	0 x2001:30	Frequency of the fifth notch filter	Notch filter frequency	0~65535		5000		
P1-30	20130	0 x2001:31	Width of the fifth notch filter	Notch filter width	0~65535		2		S
P1-31	20131	0 x2001:32	Depth of the fifth notch filter	Notch filter depth	0~65535		0		S
P1-32	20132	0 x2001:33	End vibration suppression frequency	End positioning vibration suppression frequency	10~2000		2000		S
P1-33	20133	0 x2001:34	End vibration suppression frequency compensation	End vibration suppression frequency compensation	0~200		100		S
P1-34	20134	0 x2001:35	Maximum allowable field-weakening current	Maximum allowable field-weakening current	0~100		50		S
P1-35	20135	0 x2001:36	Field-Weakening enablement	0:Disable the field-weakening function 1:Enable the field-weakening function	0~1		0		S
P1-36	20136	0 x2001:37	Field-Weakening gain	Field-Weakening gain	0~300		100%		S
P1-37	20137	0 x2001:38	Field-Weakening point velocity	Activate field-weakening control speed	0~6000		4000		P
P1-38	20138	0 x2001:39	PDFF controls the gain coefficient	PDFF controls the gain coefficient	0~100		100		
P1-39	20139	0 x2001:40	Reserved						
P1-40	20140	0 x2001:41	Reserved						T
P1-41	20141	0 x2001:42	Reserved						T
P1-42	20142	0 x2001:43	Disturbance compensation time coefficient	Disturbance compensation time coefficient	0~40000	0.1 Hz	15.0		T
P1-43	20143	0 x2001:44	Disturbance cut-off frequency	Disturbance cut-off frequency	0~40000	0.1 Hz	400.0		T
P1-44	20144	0 x2001:45	Disturbance	Disturbance	0~100	%	0.0		T

P1 group	Advanced Commissioning Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated Mode
			compensation gain	compensation gain					
P1-45	20145	0 x2001:46	Disturbance observer inertia correction coefficient	Disturbance observer inertia correction coefficient	0~3000	%	100		
P1-46	20146	0 x2001:47	Model tracking control mode	0:Do not use model tracking control 1:Enable model tracking control+rigid body model 2:Enable model tracking control+dual inertia model	0~2	%	0		
P1-47	20147	0 x2001:48	Model tracking control gain	Model tracking control gain	0~30000	0.1 Hz	400		
P1-48	20148	0 x2001:49	Model tracking control compensation gain	Model tracking control compensation gain	0~200	%	100		
P1-49	20149	0 x2001:50	Dual-inertia model resonance frequency	Dual-inertia model resonant frequency	10~2500	0.1 Hz	700		
P1-50	20150	0 x2001:51	Dual-inertia model resonance frequency	Dual-inertia model anti-resonant frequency	10~2500	0.1 Hz	500		
P1-51	20151	0 x2001:52	Dual-inertia model velocity feedforward value	Dual-inertia model velocity feedforward value	0~100	%	0		
P1-52	20152	0 x2001:53	Dual-inertia model torque feedforward value	Dual-inertia model torque feedforward value	0~100	%	0		
P1-53	20153	0 x2001:54	Reserved						
P1-54	20154	0 x2001:55	Reserved						
P1-55	20155	0 x2001:56	Torque ripple suppression frequency	Torque ripple suppression frequency	1~50000	0.1 Hz	400		
P1-56	20156	0 x2001:57	Torque ripple Suppression Compensation	Torque ripple Suppression Compensation	0~1000	0.10 %	0		
P1-57	20157	0 x2001:58	Torque ripple Suppression Phase	Torque ripple Suppression Phase	0~2048		0		
P1-58	20158	0 x2001:59	Torque Command Filter Cut-off Frequency	Cutoff frequency of torque command filtering	1~16000	Hz	4000		
P1-59~P1-99	20159~20199	0 x2001:60~0 x2001:100	Reserved						

6.1.2.3 Motor Parameter Group

P2 group	Motor Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P2-00	20200	0 x2002:01	Rated power of the motor	Rated power of the motor	1~65535	0.001 kW	75	R	
P2-01	20201	0 x2002:02	Rated current of the motor	Rated current of the motor	1~65535	0.01 A	500	R	S
P2-02	20202	0 x2002:03	Maximum current of the motor	Maximum current of the motor	1~65535	0.01 A	500	R	S
P2-03	20203	0 x2002:04	Rated speed of the motor	Rated speed of the motor	100~6000	rpm	3000	R	P
P2-04	20204	0 x2002:05	Maximum speed of the motor	Maximum speed of the motor	100~6000	rpm	6000	R	S
P2-05	20205	0 x2002:06	Rated torque of the motor	Rated torque of the motor	10~65535	0.01 Nm	239	R	S
P2-06	20206	0 x2002:07	Maximum torque of the motor	Maximum torque of the motor	10~65535	0.01 Nm	716	R	S
P2-07	20207	0 x2002:08	Maximum speed torque value of motor	Maximum speed torque value of motor	10~65535	0.01 Nm	716	R	P
P2-08	20208	0 x2002:09	Number of pole pairs in motor	Number of pole pairs in motor	2~100		5	R	S
P2-09	20209	0 x2002:10	Motor back electromotive force coefficient	Motor back electromotive force coefficient	1~65535	0.01 mV/rpm	3330	R	
P2-10	20210	0 x2002:11	Motor torque constant	Motor torque constant	1~65535	0.01 Nm/Arms	51	R	
P2-11	20211	0 x2002:12	Motor rotor inertia	Motor rotor inertia	1~65535	0.01 kg.cm ²	130	R	
P2-12	20212	0 x2002:13	Motor D-axis inductance	Motor D-axis inductance	1~65535	0.01 mH	387	R	
P2-13	20213	0 x2002:14	Motor Q-axis inductance	Motor Q-axis inductance	1~65535	0.01 mH	327	R	
P2-14	20214	0 x2002:15	Motor stator resistance	Motor stator resistance	1~65535	0.001Ω	500	R	
P2-15	20215	0 x2002:16	Electrical time constant of the motor	Electrical time constant of the motor	1~65535	0.01 ms	654	R	
P2-16	20216	0 x2002:17	Mechanical time constant of the motor	Mechanical time constant of the motor	1~65535	0.01 ms	24	R	
P2-17	20217	0 x2002:18	Zero offset of the motor	Zero offset of the motor	1~65535		205	R	
P2-18~P2-49	20218~20249	0 x2002:19~0 x2002:50	Reserved	Reserved	0~65535		0		
P2-50	20250	0 x2002:51	Internal position mode acceleration and deceleration time	The time for the internal position mode speed to accelerate from 0 to the maximum rotational speed	10~60000	ms	500		
P2-51	20251	0 x2002:52	Internal position mode Position 1 high position	Internal position mode position instruction 1 position	0~65535	p	0		
P2-52	20252	0 x2002:53	Internal position mode Position 1 low						

P2 group	Motor Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
			position						
P2-53	20253	0 x2002:54	Internal position mode Position 2 high position	Internal position mode position instruction 2 position	0~65536	p	0		
P2-54	20254	0 x2002:55	Internal position mode Position 2 low position						
P2-55	20255	0 x2002:56	Reserved	Reserved	0~65535		0		
P2-56	20256	0 x2002:57	Reserved	Reserved	0~65535		0		
P2-57	20257	0 x2002:58	Reserved	Reserved	0~65535		0		
P2-58	20258	0 x2002:59	Reserved	Reserved	0~65535		0		
P2-59	20259	0 x2002:60	Reserved	Reserved	0~65535		0		
P2-60	20260	0 x2002:61	Black box channel 1 configuration	Configure the black box data recording channel	0~96		2		
P2-61	20261	0 x2002:62	Black box channel 2 configuration	Configure the black box data recording channel	0~96		3		
P2-62	20262	0 x2002:63	Black box channel 3 configuration	Configure the black box data recording channel	0~96		6		
P2-63	20263	0 x2002:64	Black box channel 4 configuration	Configure the black box data recording channel	0~96		9		
P2-64~ P2-99	20264~ 20299	0 x2002:65~ 0 x2002:100	Reserved	Reserved	0~65535		0		

6.1.2.4 Function Parameter Group

Function Parameter Group									
P3 group	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P3-00~P3-16	20300~20316	0 x2003:01~0 x2003:17	Reserved	Reserved	0~65535		0		
P3-17	20317	0 x2003:18	Fault detection switch	Units:Abnormal detection of encoder speed measurement 0:Enable the abnormal detection of encoder speed measurement 1:Turn off the abnormal detection of encoder speed measurement Tens:0:Enable Software Instantaneous Overcurrent Detection 1:Disable Software Instantaneous Overcurrent Detection	0 x0000~0 x0011		0 x0001		
P3-18	20318	0 x2003:19	DO1 function settings	Units&tens: function settings 00:No function 01:Axis 1 ready status 02:Axis 2 ready status 03:Axis 3 ready status 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 0 A:EtherCAT virtual output DO1 0 B: EtherCAT virtual output DO2 0 C: EtherCAT virtual output DO3 0 D: EtherCAT virtual output DO4 0 E: EtherCAT virtual output DO5 0 F: EtherCAT virtual output DO6 10: EtherCAT virtual output DO7 11: EtherCAT virtual output DO8 Hundreds&thousandths:00:Positive logic 01:Anti logic	0 x0000~0 x0111		0 x0000		
P3-19	20319	0 x2003:20	DO2 function settings	Same as P3-18	0 x0000~0 x0111		0 x0000		
P3-20	20320	0 x2003:21	DO3 function settings	Same as P3-18	0 x0000~0 x0111		0 x0000		
P3-21	20321	0 x2003:22	DO4 function settings	Same as P3-18	0 x0000~0 x0111		0 x0000		
P3-22	20322	0 x2003:23	DO5 function settings	Same as P3-18	0 x0000~0 x0111		0 x0000		
P3-23	20323	0 x2003:24	DO6 function settings	Same as P3-18	0 x0000~0 x0111		0 x0000		
P3-24	20324	0 x2003:25	DO7 function settings	Same as P3-18	0 x0000~0 x0111		0 x0000		
P3-25	20325	0 x2003:26	DO8 function settings	Same as P3-18	0 x0000~0 x0111		0 x0000		
P3-26~P3-99	20326~20399	0 x2003:27~0 x2003:100	Reserved	Reserved	0~65535		0		

6.1.2.5 Monitoring Parameter Group

d0 组	Monitoring Parameter Group				
Function Codes	Modbus mapped address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Unit
d0-00	30000	0 x3000:01	Motor speed		rpm
d0-01	30001	0 x3000:02	Reserved		
d0-02	30002	0 x3000:03	DIDO status monitoring	The low 8 bits indicate DI1 to DI8, and the high 8 bits indicate DO1 to DO8	
d0-03	30003	0 x3000:04	Low-order bits of encoder position feedback		
d0-04	30004	0 x3000:05	High-order bits of encoder position feedback		
d0-05	30005	0 x3000:06	Position bias		
d0-06	30006	0 x3000:07	q-axis voltage		
d0-07	30007	0 x3000:08	Bus synchronization correction cycle	Bus synchronization correction cycle	
d0-08	30008	0 x3000:09	d-axis voltage		
d0-09	30009	0 x3000:10	Average load rate		
d0-10	30010	0 x3000:11	Multi-circle position		
d0-11	30011	0 x3000:12	The encoder obtains the motor code	The encoder obtains the motor code	
d0-12	30012	0 x3000:13	Position instruction high position		
d0-13	30013	0 x3000:14	Position instruction low position		
d0-14	30014	0 x3000:15	Reserved		
d0-15	30015	0 x3000:16	Electrical angle of motor		
d0-16	30016	0 x3000:17	Bus voltage		0.1 V
d0-17	30017	0 x3000:18	Historical lowest bus voltage		0.1 V
d0-18	30018	0 x3000:19	Historical highest bus voltage		0.1 V
d0-19	30019	0 x3000:20	Drive temperature		0.1 °C
d0-20	30020	0 x3000:21	Encoder fault count		
d0-21	30021	0 x3000:22	Target position high position		
d0-22	30022	0 x3000:23	Target position low position		
d0-23~ d0-27	30023~ 30027	0 x3000:24~ 0 x3000:28	Reserved		
d0-28	30028	0 x3000:29	Motor overload rate	Motor overload rate	%
d0-29~ d0-32	30029~ 30032	0 x3000:30~ 0 x3000:33	Reserved		
d0-33	30033	0 x3000:34	The original value of the U-phase current sampling		
d0-34	30034	0 x3000:35	The original value of the V-phase current sampling		
d0-35	30035	0 x3000:36	Reserved		
d0-36	30036	0 x3000:37	Motor torque feedback		%
d0-37	30037	0 x3000:38	Reserved		
d0-38	30038	0 x3000:39	Motor torque setting		%
d0-39~ d0-50	30039~ 30050	0 x3000:40~ 0 x3000:51	Reserved		
d0-51	30051	0 x3000:52	Maximum communication cycle of EtherCAT		
d0-52	30052	0 x3000:53	Real-time communication cycle of EtherCAT		
d0-53~ d0-91	30053~ 30091	0 x3000:54~ 0 x3000:92	Reserved		
d0-92	30092	0 x3000:93	ECT input port CRC error count	ECT input port CRC error count	
d0-93	30093	0 x3000:94	ECT input port receives error count	ECT input port receives error count	
d0-94	30094	0 x3000:95	ECT input port forwarding error count	ECT input port forwarding error count	
d0-95	30095	0 x3000:96	ECT input port frame drop count	ECT input port frame drop count	
d0-96	30096	0 x3000:97			
d0-97	30097	0 x3000:98	Software version - year		
d0-98	30098	0 x3000:99	Software version - Month/Day		
d0-99	30099	0 x3000:100	Software version-SN		

6.1.2.6 Alarm Code and Description

ErrCode	Alarm Code and Description				
Function Codes	EtherCAT encoding	Function Code Name	Fault principle	Exclusion method	Can it be reset
Er.001	0 xFF01	Emergency stop alarm	Emergency stop function enabled (P0-18=1), signal invalid	1,Check the external emergency stop circuit 2,Check whether the hundred-bit logic of the DI function parameters is consistent with the external signal logic. 3,Whether the 24 V power supply and the access signal are of the same origin	Y
Er.002	0 xFF02	Overcurrent	A large current exceeding the detection threshold was collected	1,Check whether the motor code is correct 2,Check whether the encoder cable corresponds to the motor 3,Check for interphase short circuits in UVW and short circuits to ground 4,After unplugging the power line and repowering, the driver still gave an alarm and needs to be returned to the factory for inspection Note: This alarm can be cleared after restoring power to the unit	N
Er.003	0 xFF03	Reserved			
Er.004	0 xFF04	Internal communication anomaly	Abnormal internal communication drive	Need to return to the factory for repair	
Er.005	0 xFF05	Overload	The motor current exceeds the rated current and runs for a long time	1,Check whether the motor code is correct 2,Check whether the encoder cable corresponds to the motor and whether the UVW phase sequence is correct 3,Check whether the motor brake is normally open 4,Check whether the resistance of the motor or mechanical structure is too large 5,The motor selection is too small. Recalculate the motor selection	Y
Er.006	0 xFF06	Reserved			
Er.007	0 xFF07	Driver initialization in progress	Driver initialization failed and current sampling is abnormal	1,Check whether the bus voltage is normal 2,Check whether the power line is short-circuited to ground 3,Check if the motor is damaged and has a three-phase resistance imbalance 4,The wrong firmware version was installed on the drive	Y
Er.008	0 xFF08	Reserved			
Er.009	0 xFF09	Abnormal three-phase current	The motor current is abnormal, and the feedback current is inconsistent with the command current	1,Check if the motor power line is connected, if the UVW phase sequence is correct, if there are any missing phases, and if the motor code is correct 2,Check if the gain is too large 3,Check if the bus voltage is too low and the motor cannot reach its maximum speed	Y
Er.010	0 xFF0A	Reserved			
Er.011	0 xFF0B	Bus undervoltage	Bus voltage below limit value	1,Check whether the input power supply voltage is too low 2,Check whether the grid voltage fluctuates greatly	Y
Er.012	0 xFF0C	Bus overvoltage	Bus voltage exceeds the limit value	1,Check whether the grid voltage is too high 2,Check whether the connection of the braking resistor is reliable and whether it meets the specifications	Y
Er.013	0 xFF0D	Position instruction too large	The speed of the position command issued by the controller exceeds 12,000 revolutions within the speed cycle	1,Check whether the control instructions are reasonable 2,Check whether the electronic gear Settings are reasonable 3,Check whether the zero point of the controller is correct	Y

Er.014	0 xFF0E	Reserved			
ErrCode	Alarm Code and Description				
Function Codes	EtherCAT encoding	Function Code Name	Fault principle	Exclusion method	Can it be reset
Er.015	0 xFF0F	Drive overheating	The sensor detects that the temperature exceeds the limit value	1,Check whether the cooling fan is working properly 2,Check whether the heat dissipation of the electrical cabinet is reasonable 3,Abnormal temperature sampling, check the temperature display D0-19. If the deviation value is large, it needs to be returned to the factory for testing	Y
Er.016	0 xFF10	Failed to write the EEPROM	EEPROM data error	1,Restore factory settings 2,Reset the parameters 3,After restoring the factory settings, the parameters cannot be saved and need to be returned to the manufacturer for testing	Y
Er.017	0 xFF11	Failed to read the EEPROM	EEPROM data error	1,Restore factory settings 2,Reset the parameters 3,After restoring the factory settings, the parameters cannot be saved and need to be returned to the manufacturer for testing	Y
Er.018	0 xFF12	Excessive positional deviation	The actual position deviation is greater than the set position deviation limit	1,Check whether the servo motor can move normally 2,Check whether the servo speed and torque are limited 3,Check whether the command speed of the controller exceeds the maximum speed of the motor 4,The position deviation limit is set too small 5,Check the DC bus voltage. When the voltage is too low, the motor speed cannot reach the maximum value	Y
Er.019	0 xFF13	Reserved			
Er.020	0 xFF14	Encoder error	The encoder failed to communicate continuously for multiple times	1,The encoder wiring definition is incorrect 2,Check whether the encoder wiring is reliable 3,Check whether the grounding of the electrical cabinet is reliable 4,Check whether the specifications of the wires Compliance Standardss	Y
Er.021	0 xFF15	Abnormal speed measurement	The single-turn encoder data is abnormal	Replace the motor	Y
Er.022	0 xFF16	The encoder is being initialized	The communication between the servo and the motor encoder has not been established	1,The motor encoder line is not connected 2,Check whether the wiring of the motor encoder is correct 3,Check whether the motor code is correct (The encoder protocol corresponding to the motor code is abnormal) 4,The firmware version of the drive is incorrect 5,Replace the motor	Y
Er.023	0 xFF17	Reserved			
Er.024	0 xFF18	External associated alarm	After setting the associated alarm (the tens digit of P0-18 is 1), there are alarms for other axes in the multi-axis drive	Check other alarm axes and investigate the cause of the alarm	Y
Er.025	0 xFF19	Reserved			
Er.026	0 xFF1A	Reserved			
Er.027	0 xFF1B	EEPROM parameter verification on error	EEPROM initialization error	1,Restore factory settings 2,Reset the parameters 3,After restoring the factory settings, the parameters cannot be saved and need to be returned to the manufacturer for testing	Y
Er.028	0 xFF1C	Reserved			
Er.029	0 xFF1D	Reserved			
Er.030	0 xFF1E	Reserved			

Er.031	0 xFF1F	The alarm clearing is too frequent	The time interval for clearing the alarm is too short	Prioritize investigating the cause of the alarm, and clear the alarm after troubleshooting	Y
ErrCode	Alarm Code and Description				
Function Codes	EtherCAT encoding	Function Code Name	Fault principle	Exclusion method	Can it be reset
Er.032	0 xFF20	Parameter initialization error	EEPROM initialization error	Restore factory settings	Y
Er.033	0 xFF21	EtherCAT communication error	Network communication error	1,The main station is not connected or disconnected 2,Check the material and specification of the network cable and whether the connection is reliable, or replace the network cable for testing 3,When the network cable is interfered with, avoid strong current and check whether the grounding of the electrical cabinet is good	Y
Er.034	0 xFF22	Battery failure	The voltage of the encoder battery is below the threshold	1,Replace the encoder battery 2,Check whether the wiring of the encoder battery is correct and whether the contact is reliable Note: After the fault is reset, an alarm will be triggered again one minute after operation.	Y
Er.035	0 xFF23	Reserved			
Er.036	0 xFF24	Multiple circles lost	Encoder multi-turn position data was lost due to the battery voltage falling below the threshold	1,Replace the encoder battery 2,Check whether the wiring of the encoder battery is correct and whether the contact is reliable. Note: When an alarm occurs, DS402 statusword bit3=1, and setting controlword to 0x80 cannot clear the alarm. You need to set controlword bit 12 to 1 to clear it. After successful clearing, statusword bit3=0	Y
Er.037	0 xFF25	Reserved			
Er.038	0 xFF26	Motor code recognition error	After enabling the automatic motor code recognition, the motor code recognition does not match the model	1,Connect the motor to the drive of the corresponding power module 2,Turn off the automatic recognition of the motor code (set the P0-9 thousands to 0), and manually set the motor code	Y
Er.039	0 xFF27	Reserved			
Er.040	0 xFF28	Abnormal speed measurement of encoder	Speed readings from both communication encoders are in excess of 15,000 rpm	1,Replace the motor	Y
Er.041	0 xFF29	Reserved			
Er.042	0 xFF2A	Motor runaway	There is a serious deviation between the speed command and the speed feedback in the position mode	1,Check whether the motor code is correct 2,Check the motor wiring 3, Replace the motor	Y
Er.043	0 xFF2B	Reserved			
Er.044	0 xFF2C	Instantaneous current overload	Current sampling data exceeds the overload threshold instantaneously	1,Check whether the motor code is correct 2,Check whether the motor circuit is correct and whether it is short-circuited to ground 3,Increase the servo gain parameter	Y
Er.045	0 xFF2D	Reserved			
Er.046	0 xFF2E	Instantaneous overcurrent	Current sampling data instantly exceeds overcurrent threshold	1,Check whether the motor code is correct 2,Check whether the motor circuit is correct and whether it is short-circuited to ground 3,Increase the servo gain parameter	Y
Er.047	0 xFF2F	Reserved			
Er.048	0 xFF30	The power line is not connected	The motor wire is not connected	The motor power line has poor contact or is not connected	Y
Er.049	0 xFF31	Reserved			

Er.050	0 xFF32	Positive limit trigger	Positive limit alarm function triggered	1,Check whether the function definition of the DI terminal matches the external signal 2,Check the external forward limit signal 3,The device has reached the forward limit position and needs to be moved away from the limit signal	Y
ErrCode	Alarm Code and Description				
Function Codes	EtherCAT encoding	Function Code Name	Fault principle	Exclusion method	Can it be reset
Er.051	0 xFF33	Negative limit trigger	Negative limit alarm function triggered	1,Check whether the function definition of the DI terminal matches the external signal Check the external negative limit signal 2,The device has reached the negative limit position and needs to be moved away from the limit signal	Y
Er.052	0 xFF34	Double STO trigger	Both channels of the Safe Torque Off (STO) are triggered	Check the wiring of the two safety circuits	Y
Er.053	0 xFF35	STO1 trigger	First-channel safety torque shutoff trigger	Check the wiring of the first safety circuit	Y
Er.054	0 xFF36	STO2 trigger	Second channel safety torque shutoff trigger	Check the wiring of the second safety circuit	Y
Er.055	0 xFF37	STO detection error	Safety torque shutoff hardware detection error	Please consult the manufacturer's personnel	Y
Er.056	0 xFF38	Anti-collision signal trigger	Anti-collision signal trigger	Check the status of the external anti-collision signal and the wiring.	Y
Er.057~Er.100	0 xFF31~0 xFF64	Reserved			
Er.227	0 xFFE3	Hardware encryption error	The drive has not undergone hardware decryption or uses pirated hardware	Please consult the manufacturer's personnel	N

6.1.3 Drive Module Axis 2 Servo Parameter Group

6.1.3.1 Basic Parameter Group

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Set the scope	Unit	Factory Default	Attribute	Associated pattern
P0-00	22000	0 x2100:01	Software version	Software version	0~65535		1000	R	
P0-01	22001	0 x2100:02	Driver model	4:S5R0(5 A) 220 V 5:S8R0(8 A) 220 V 6:S015(15 A) 220 V 7:T6R0(6 A) 380 V 8:T8R5(8.5 A) 380 V 9:T12 R(12 A) 380 V 10:T20 R(20 A) 380 V 11:T25 R(25 A) 380 V 12:T35 R(35 A) 380 V	4~12		4	■	
P0-02	22002	0 x2100:03	Motor code	Motor ID:1000~3500	1000~3500		1400	■	
P0-03	22003	0 x2100:04	Parameter management	Units and tens: Reserved Hundreds: Restore factory parameters 0:no action 1:Restore factory Settings (automatically reset to zero upon completion) Thousands: Reserved	0 x0000~0 x1111		0 x0000	H/■	P. S.T
P0-04	22004	0 x2100:05	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	0 x2100:06	Maximum speed threshold	0~6000	0~6000	rpm	4500		
P0-06	22006	0 x2100:07	Forward maximum torque limit	0~300	0~300	%	300		
P0-07	22007	0 x2100:08	Reverse maximum torque limit	0~300	0~300	%	300		
P0-08	22008	0 x2100:09	Motor direction logic	0: CCW direction is the positive rotation direction 1: CW direction is the positive rotation direction	0~1		0	■	
P0-09	22009	0 x2100:10	Encoder type setting	Units:Encoder type 0:Incremental type 1:Multi-turn absolute value type 2:Single-turn absolute value type Tens: Bit0: 0:Disable Speed Detection Alarm 1: Enable Speed Detection Alarm Bit1: 0:Disable Overspeed Alarm 1: Enable Overspeed Alarm Bit2: 0:Disable Software Short-Circuit Alarm 1:Enable Software Short-Circuit Alarm Hundreds:	0 x0000~0 x2113				

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Set the scope	Unit	Factory Default	Attribute	Associated pattern
				Bit4: 0:EtherCAT speed unit selected in rpm 1:EtherCAT speed unit selected in pp/s Thousands:Motor code recognition					
P0-10	22010	0 x2100:11	Control Mode	0:TRQ 1:SPD 2:POS 3:EtherCAT 4:Gantry Follow Mode	0~13		0		PS
P0-11	22011	0 x2100:12	Brake ON delay time	Delay Time from Servo-On Command to Brake Engagement	100~500	ms	100	■	P. S.T
P0-12	22012	0 x2100:13	Stationary state, brake OFF-servo OFF delay	Delay Time from Servo-Off Command to Motor Power-Off	1~1000	ms	100	■	P. S.T
P0-13	22013	0 x2100:14	Reserved						
P0-14	22014	0 x2100:15	Reserved						
P0-15	22015	0 x2100:16	Overload protection coefficient of motor	10~100	10~100	%	50		
P0-16	22016	0 x2100:17	USB monitoring settings	Units:USB low-speed monitoring sampling interval, unit ms (0-5) Tens:USB monitoring mode setting0:Turn off monitoring 1:Low speed monitoring 2:High speed monitoring, sampling frequency 8k 3:High speed monitoring, sampling frequency 16k Hundreds:Reserved Thousands:Reserved	0 x0000~0 x0035		0 x0000	H/■	P. S.T
P0-17	22017	0 x2100:18	The keyboard enables control of characters	0:Servo OFF,1:Servo ON	0~1		0	■	
P0-18	22018	0 x2100:19	External emergency stop control	Units:External emergency stop alarm detection enable 0:Do not detect external emergency stop signals 1:Detecting external emergency stop signals Tens:Associated alarm enable 0:Do not enable associated alarm 1:Enable associated alarm	0 x0000~0 x0011		0	■	
P0-19	22019	0 x2100:20	Reserved						
P0-20	22020	0 x2100:21	Load inertia ratio	The ratio of load inertia to motor inertia	0~3000	%	100		S
P0-21	22021	0 x2100:22	Speed loop gain	The larger the response, the faster it will be, and if it is too large, it will cause vibration The position mode and position loop gain are adjusted in coordination	20~20000	0.1 Hz	800		S
P0-22	22022	0 x2100:23	The integral time constant of the velocity loop	The larger the integral, the stronger the integration effect, and the stronger the speed	0~20000	0.1 Hz	10		S

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Set the scope	Unit	Factory Default	Attribute	Associated pattern
				tracking ability, which needs to be coordinated with the speed loop gain and position loop gain					
P0-23	22023	0 x2100:24	Position loop gain	The larger the response, the faster it will be, and if it is too large, it will cause vibration The position mode and position loop gain are adjusted in coordination	20~20000	0.1 Hz	200		P
P0-24	22024	0 x2100:25	Second speed loop gain	The larger the response, the faster it will be, and if it is too large, it will cause vibration The position mode and position loop gain are adjusted in coordination	20~20000	0.1 Hz	800		S
P0-25	22025	0 x2100:26	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 speed loop gain and position loop gain	20~1000.0	0.1 Hz	125		S
P0-26	22026	0 x2100:27	Second position loop gain	The larger the response, the faster it will be, and if it is too large, it will cause vibration The position mode and position loop gain are adjusted in coordination	20~2000.0	0.1 Hz	200		P
P0-27	22027	0 x2100:28	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	0 x0000~0 x1111		0	■	P
P0-28	22028	0 x2100:29	Speed feedforward gain	Increasing can reduce the steady-state position deviation, but if it is too large, it can lead to overshoot	0~100	%	0		P
P0-29	22029	0 x2100:30	Speed feedforward smoothing filter constant	Smooth the velocity feedforward quantity and adjust it in coordination with the velocity feedforward gain	0~64.0	ms	0		P
P0-30	22030	0 x2100:31	Reserved	Reserved	50~1000		100		P

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Set the scope	Unit	Factory Default	Attribute	Associated pattern
P0-31	22031	0 x2100:32	DI1function	Units&tens: 00~05:Reserved 08:Emergency stop 09:Axis 1 origin switch 0 A:Axis 2 origin switch 0 B:Axis 3 origin switch 0 C:Axis 1 positive limit 0 D:Axis 2 positive limit 0 E:Axis 3 positive limit 0 F: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	0 x0000~ 0 x0117		000 D		
P0-32	22032	0 x2100:33	DI2function	Same as P0-31	0 x0000~ 0 x0117		0010		
P0-33	22033	0 x2100:34	DI3function	Same as P0-31	0 x0000~ 0 x0117		000 A		
P0-34	22034	0 x2100:35	DI4function	Same as P0-31	0 x0000~ 0 x0117		0013		
P0-35	22035	0 x2100:36	DI5function	Same as P0-31	0 x0000~ 0 x0117		0016		
P0-36	22036	0 x2100:37	Reserved	Reserved					
P0-37	22037	0 x2100:38	DI filtering time (DI1~DI6)	0~32 ms	0~32		0		
P0-38	22038	0 x2100:39	Electronic gear selection	0:Set value using object dictionary 0x6091 1:Use the values of P0-39(high bits) and P0-40 (low bits)	0~1		0		
P0-39	22039	0 x2100:40	Number of position command pulses corresponding to one rotation of the motor (high position)	0~20000	0~20000		838	■	P
P0-40	22040	0 x2100:41	Number of position command pulses corresponding to one rotation of the motor (low position)	0~9999 Pulse per revolution=(P0-39)*1000 0+(P0-40)	0~9999		8608	■	P
P0-41	22041	0 x2100:42	Moving average filter constant	--	0~200.0	ms	0		P
P0-42	22042	0 x2100:43	First order low-pass filter constant	--	0~6000.0	ms	0		P
P0-43	22043	0 x2100:44	Reserved	--	0~65535		0	L	P
P0-44	22044	0 x2100:45	Reserved	--	0~16384		2		
P0-45	22045	0 x2100:46	Reserved	--	0~65535		10000	L	P
P0-46	22046	0 x2100:47	Reserved	--	0~16384		0		
P0-47	22047	0 x2100:48	Reserved	--	4~16384		2500	■	P
P0-48	22048	0 x2100:49	Reserved	--	0 x0000~ 0 x0001		0 x0000	H/■	P
P0-49	22049	0 x2100:50	Position deviation limit	0.1~50.0 turns	0.1~50.0		10.0	■	

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Set the scope	Unit	Factory Default	Attribute	Associated pattern
P0-50	22050	0 x2100:51	EtherCAT synchronization cycle	1~256 (x0.125 ms)=[0.125 ms~32 ms]	1~256	0.125/ms	8		
P0-51	22051	0 x2100:52	Quadrant Protuberance CCW Compensation Value	0~1000‰	0~1000		0		
P0-52	22052	0 x2100:53	Quadrant Protuberance CW Compensation Value	0~1000‰	0~1000		0		
P0-53	22053	0 x2100:54	Quadrant Protuberance Compensation Delay Time	0~1000 ms	0~1000		0		
P0-54	22054	0 x2100:55	Quadrant Protuberance Compensation Filtering	0~100 ms	0~100		0		
P0-55	22055	0 x2100:56	Gravity compensation value	0~1000‰	0~1000		0		
P0-56	22056	0 x2100:57	Gravity compensation polarity	0: CCW direction compensation 1: CW direction compensation	0~1		0		
P0-57	22057	0 x2100:58	Notch filter frequency	10-5000 Hz	10~5000		100		
P0-58	22058	0 x2100:59	Notch filter depth	0~20	0~20		10		
P0-59	22059	0 x2100:60	Notch filter gain	0~500%	0~500		0		
P0-60	22060	0 x2100:61	Zero offset of the magnetic pole	0~2048,<<12	0~2048		253		
P0-61	22061	0 x2100:62	Speed command (for debugging)	Speed command reference set by Pn parameter	0~4500	rpm	100		
P0-62	22062	0 x2100:63	Reserved						
P0-63	22063	0 x2100:64	Reserved						
P0-64	22064	0 x2100:65	Reserved						
P0-65	22065	0 x2100:66	Ud-Kp	130	0~800		50		
P0-66	22066	0 x2100:67	Ud-Ki	25	0~500		25		
P0-67	22067	0 x2100:68	Uq-Kp	130	0~300		50		
P0-68	22068	0 x2100:69	Uq-Ki	25	0~300		25		
P0-69	22069	0 x2100:70	Reserved						
P0-70	22070	0 x2100:71	Speed command polarity	0~1	0~1		0		
P0-71	22071	0 x2100:72	Servo adaptive rigidity	20~20000(Prevent nodding phenomenon during the enabling process under gravity or load conditions)	20~20000		1200	▲	
P0-72	22072	0 x2100:73	The first set of gain speed inflection points	/	0~6000	rpm	6000		
P0-73	22073	0 x2100:74	The second set of gain speed inflection points	/	0~6000	rpm	6000		
P0-74~P0-79	22074~22079	0 x2100:75~0 x2100:80	Reserved						
P0-80	22080	0 x2100:81	One-click Aging Parameters		0~6		0		

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Set the scope	Unit	Factory Default	Attribute	Associated pattern
P0-81	22081	0 x2100:82	Internal function switch	Units:DC Bus Voltage Linked Adjustment Enable 0:Close 1:Enable Tens:Dead zone compensation enable 0:Close 1:Enable Hundreds:Peak current suppression 0:Close 1:Enable Thousands:Reserved 0:Normal mode	0 x0000~0 x111		0 x0000	H	P. S.T
P0-82	22082	0 x2100:83	Manufacturer calibration mode	Units:Manufacturer's current calibration mode 0:Close 1:Enable,The motor is only used for internal calibration by the manufacturer others:Reserved	0 x0000~0 x0001		0 x0000	H	PST
P0-83	22083	0 x2100:84	Reserved						
P0-84	22084	0 x2100:85	VDC calibration	27800~37683	27800~37683		27800	K	P. S.T
P0-85	22085	0 x2100:86	High position of serial number (first test year)	2015~2029	2015~2029		2017	K	P. S.T
P0-86	22086	0 x2100:87	Median of serial number (first test month day)	0101~1231	0101~1231		907	K	P. S.T
P0-87	22087	0 x2100:88	Low position of serial number (first test serial number)	0 x0000~0xFFFF	0 x0000~0 xFFFF		0 x0000	H/K	P. S.T
P0-88	22088	0 x2100:89	Single-board tooling test QC label	0 xA7E3:Pass Others:NG	0 x0000~0 xFFFF		0 x0000	H/K	P. S.T
P0-89	22089	0 x2100:90	Pre-aging QC test label	0 x8F68:Pass Others:NG	0 x0000~0 xFFFF		0 x0000	H/K	P. S.T
P0-90	22090	0 x2100:91	12-hour aging test label	0 x5A5 A:Pass Others:NG	0 x0000~0 xFFFF		0 x0000	H/K	P. S.T
P0-91	22091	0 x2100:92	Post-aging final test label	0 xB80F:Pass Others:NG	0 x0000~0 xFFFF		0 x0000	H/K	P. S.T
P0-92	22092	0 x2100:93	Function Password	E5DA:Clear the multi-turn values of the encoder	0 x0000~0 xFFFF		0 x0000	H/K	P. S.T
P0-93	22093	0 x2100:94	Reserved						
P0-94	22094	0 x2100:95	Reserved	Reserved					
P0-95	22095	0 x2100:96	Reserved	Reserved	0 x0000~0 xFFFF		0 x0000	H/K	P. S.T
P0-96	22096	0 x2100:97	Reserved	Reserved	0 x0000~0 xFFFF		0 x0000	H/R/K	P. S.T
P0-97	22097	0 x2100:98	Reserved	Reserved	0 x0000~0 xFFFF		0 x0000	H/R/K	P. S.T
P0-98	22098	0 x2100:99	Reserved	Reserved	0 x0000~0 xFFFF		0 x0000	H/R/K	P. S.T
P0-99	22099	0 x2100:100	Reserved	Reserved	0 x0000~0 xFFFF		0 x0000	H/K	

6.1.3.2 Advanced Commissioning Parameter Group

P1 group	Advanced Commissioning Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P1-00	22100	0 x2101:01	Self-Tuning Mode	0:Manual adjustment 1:Rigidity grade adjustment 2:Position loop bandwidth + inertia self-tuning (slow change) 3:Position loop bandwidth + inertia self-tuning (rapid change)	0~3		0		
P1-01	22101	0 x2101:02	Rigidity grade	Rigidity grade setting	1~32		12		
P1-02	22102	0 x2101:03	Reserved	Reserved	0~65535		0		
P1-03	22103	0 x2101:04	Inertia Identification mode	0:Internal instruction round-trip motion mode 1:Controller command mode 2:Continuous automatic recognition	0~2		0		
P1-04	22104	0 x2101:05	Inertia Identification completion mark	0:Inertia Identification is not completed 1:The inertia identification has been completed	0~1		0		
P1-05	22105	0 x2101:06	Max Speed for Inertia Identification	Inertia Identification allows for the maximum operating speed	100~3000	rpm	1000		
P1-06	22106	0 x2101:07	Inertia Identification Acceleration Time	The time it takes for the inertia identification speed to accelerate from 0 to 5000 rpm	10~30000	ms	100		
P1-07	22107	0 x2101:08	Maximum Movement Revolutions for Inertia Identification	Permitted Travel Revolutions for Inertia Identification	1~50	r	5		
P1-08	22108	0 x2101:09	Waiting time for completion of single inertia identification	Waiting time for completion of single inertia identification motion	0~30000	ms	100		
P1-09	22109	0 x2101:10	Reserved	Reserved	0~65535		0		
P1-10	22110	0 x2101:11	Reserved	Reserved	0~65535		0		
P1-11	22111	0 x2101:12	Reserved	Reserved	0~65535		0		
P1-12	22112	0 x2101:13	Reserved	Reserved	0~65535		0		
P1-13	22113	0 x2101:14	Reserved	Reserved	0~65535		0		
P1-14	22114	0 x2101:15	Reserved	Reserved	0~65535		0		
P1-15	22115	0 x2101:16	Vibration detection threshold	Vibration detection threshold	0~100		100		
P1-16	22116	0 x2101:17	Vibration detection time	Vibration detection time	0~100		50		
P1-17	22117	0 x2101:18	Frequency of the first notch filter	Notch filter frequency	0~65535		5000		
P1-18	22118	0 x2101:19	Width of the first notch filter	Notch filter width	0~65535		2		
P1-19	22119	0 x2101:20	Depth of the first notch filter	Notch filter depth	0~65535		0		

P1 group	Advanced Commissioning Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P1-20	22120	0 x2101:21	Frequency of the second notch filter	Notch filter frequency	0~65535		5000		
P1-21	22121	0 x2101:22	Width of the second notch filter	Notch filter width	0~65535		2		
P1-22	22122	0 x2101:23	Depth of the second notch filter	Notch filter depth	0~65535		0		
P1-23	22123	0 x2101:24	Frequency of the third notch filter	Notch filter frequency	0~65535		5000		
P1-24	22124	0 x2101:25	Width of the third notch filter	Notch filter width	0~65535		2		
P1-25	22125	0 x2101:26	Depth of the third notch filter	Notch filter depth	0~65535		0		P
P1-26	22126	0 x2101:27	Frequency of the fourth notch filter	Notch filter frequency	0~65535		5000		P
P1-27	22127	0 x2101:28	Width of the fourth notch filter	Notch filter width	0~65535		2		P
P1-28	22128	0 x2101:29	Depth of the fourth notch filter	Notch filter depth	0~65535		0		
P1-29	22129	0 x2101:30	Frequency of the fifth notch filter	Notch filter frequency	0~65535		5000		
P1-30	22130	0 x2101:31	Width of the fifth notch filter	Notch filter width	0~65535		2		S
P1-31	22131	0 x2101:32	Depth of the fifth notch filter	Notch filter depth	0~65535		0		S
P1-32	22132	0 x2101:33	End vibration suppression frequency	End positioning vibration suppression frequency	0~65535		2000		S
P1-33	22133	0 x2101:34	End vibration suppression frequency compensation	End vibration suppression frequency compensation	0~200		100		S
P1-34	22134	0 x2101:35	Maximum allowable field-weakening current	Maximum allowable field-weakening current	0~100		50		S
P1-35	22135	0 x2101:36	Field-Weakening enablement	0:Disable the field-weakening function 1:Enable the field-weakening function	0~1		0		S
P1-36	22136	0 x2101:37	Field-Weakening gain	Field-Weakening gain	0~300		100%		S
P1-37	22137	0 x2101:38	Field-Weakening point velocity	Activate field-weakening control speed	0~6000		4000		P
P1-38	22138	0 x2101:39	PDFF controls the gain coefficient	PDFF controls the gain coefficient	0~100		100		
P1-39	22139	0 x2101:40	Reserved						
P1-40	22140	0 x2101:41	Reserved						T
P1-41	22141	0 x2101:42	Reserved						T
P1-42	22142	0 x2101:43	Disturbance compensation time coefficient	Disturbance compensation time coefficient	0~40000	0.1 Hz	15.0		T
P1-43	22143	0 x2101:44	Disturbance cut-off frequency	Disturbance cut-off frequency	0~40000	0.1 Hz	400.0		T
P1-44	22144	0 x2101:45	Disturbance compensation gain	Disturbance compensation gain	0~100	%	0.0		T

P1 group	Advanced Commissioning Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P1-45	22145	0 x2101:46	Disturbance observer inertia correction coefficient	Disturbance observer inertia correction coefficient	0~3000	%	100		
P1-46	22146	0 x2101:47	Model tracking control mode	0:Do not use model tracking control 1:Enable model tracking control+rigid body model 2:Enable model tracking control+dual inertia model	0~300	%	10		
P1-47	22147	0 x2101:48	Model tracking control gain	Model tracking control gain	0~30000	0.1 Hz	400		
P1-48	22148	0 x2101:49	Model tracking control compensation gain	Model tracking control compensation gain	0~200	%	100		
P1-49	22149	0 x2101:50	Dual-inertia model resonance frequency	Dual-inertia model resonant frequency	1~100		1		
P1-50	22150	0 x2101:51	Dual-inertia model resonance frequency	Dual-inertia model anti-resonant frequency	100~6000	rpm	3000		
P1-51	22151	0 x2101:52	Dual-inertia model velocity feedforward value	Dual-inertia model velocity feedforward value	0~100	%	0		
P1-52	22152	0 x2101:53	Dual-inertia model torque feedforward value	Dual-inertia model torque feedforward value	0~100	%	0		
P1-53	22153	0 x2101:54	Reserved						
P1-54	22154	0 x2101:55	Reserved						
P1-55	22155	0 x2101:56	Torque ripple suppression frequency	Torque ripple suppression frequency	1~50000	0.1 Hz	400		
P1-56	22156	0 x2101:57	Torque ripple Suppression Compensation	Torque ripple Suppression Compensation	0~100	%	0		
P1-57	22157	0 x2101:58	Torque ripple Suppression Phase	Torque ripple Suppression Phase	0~2048		0		
P1-58	22158	0 x2101:59	Torque Command Filter Cut-off Frequency	Torque Command Filter Cut-off Frequency	1~16000	Hz	4000		
P1-59~ P1-99	22159~ 22199	0 x2101:60~0 x2101:100	Reserved						

6.1.3.3 Motor Parameter Group

P2 group	Motor Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P2-00	22200	0 x2102:01	Rated power of the motor	Rated power of the motor	1~65535	0.001 kW	75	R	
P2-01	22201	0 x2102:02	Rated current of the motor	Rated current of the motor	1~65535	0.01 A	500	R	S
P2-02	22202	0 x2102:03	Maximum current of the motor	Maximum current of the motor	1~65535	0.01 A	500	R	S
P2-03	22203	0 x2102:04	Rated speed of the motor	Rated speed of the motor	100~6000	rpm	3000	R	P
P2-04	22204	0 x2102:05	Maximum speed of the motor	Maximum speed of the motor	100~6000	rpm	6000	R	S
P2-05	22205	0 x2102:06	Rated torque of the motor	Rated torque of the motor	10~65535	0.01 Nm	239	R	S
P2-06	22206	0 x2102:07	Maximum torque of the motor	Maximum torque of the motor	10~65535	0.01 Nm	716	R	S
P2-07	22207	0 x2102:08	Maximum speed torque value of motor	Maximum speed torque value of motor	10~65535	0.01 Nm	716	R	P
P2-08	22208	0 x2102:09	Number of pole pairs in motor	Number of pole pairs in motor	2~100		5	R	S
P2-09	22209	0 x2102:10	Motor back electromotive force coefficient	Motor back electromotive force coefficient	1~65535	0.01 mV/rpm	3330	R	
P2-10	22210	0 x2102:11	Motor torque constant	Motor torque constant	1~65535	0.01 Nm/Arms	51	R	
P2-11	22211	0 x2102:12	Motor rotor inertia	Motor rotor inertia	1~65535	0.01 kg.cm ²	130	R	
P2-12	22212	0 x2102:13	Motor D-axis inductance	Motor D-axis inductance	1~65535	0.01 mH	387	R	
P2-13	22213	0 x2102:14	Motor Q-axis inductance	Motor Q-axis inductance	1~65535	0.01 mH	327	R	
P2-14	22214	0 x2102:15	Motor stator resistance	Motor stator resistance	1~65535	0.001Ω	500	R	
P2-15	22215	0 x2102:16	Electrical time constant of the motor	Electrical time constant of the motor	1~65535	0.01 ms	654	R	
P2-16	22216	0 x2102:17	Mechanical time constant of the motor	Mechanical time constant of the motor	1~65535	0.01 ms	24	R	
P2-17	22217	0 x2102:18	Zero offset of the motor	Zero offset of the motor	1~65535		205	R	
P2-18~P2-49	22218~22249	0 x2102:19~0x2102:50	Reserved	Reserved	0~65535		0		
P2-50	22250	0 x2102:51	Internal position mode acceleration and deceleration time	The time for the internal position mode speed to accelerate from 0 to the maximum rotational speed	10~60000	ms	500		
P2-51	22251	0 x2102:52	Internal position mode Position 1 high position	Internal position mode position instruction 1 position	0~65535	p	0		
P2-52	22252	0 x2102:53	Internal position mode Position 1 low position						
P2-53	22253	0 x2102:54	Internal position mode Position 2 high position	Internal position mode position instruction 2 position	0~65536	p	0		
P2-54	22254	0 x2102:55	Internal position mode Position 2 low position						
P2-55~P2-59	22255~22259	0 x2102:56~0x2102:60	Reserved	Reserved	0~65535		0		
P2-60	22260	0 x2102:61	Black box	Configure the black box	0~96		34		

P2 group	Motor Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
			channel 1 configuration	data recording channel					
P2-61	22261	0 x2102:62	Black box channel 2 configuration	Configure the black box data recording channel	0~96		35		
P2-62	22262	0 x2102:63	Black box channel 3 configuration	Configure the black box data recording channel	0~96		38		
P2-63	22263	0 x2102:64	Black box channel 4 configuration	Configure the black box data recording channel	0~96		41		
P2-64	22264	0 x2102:65	Internal sweep mode selection	0:Open-loop mode 1:Closed-loop mode	0~1		0		
P2-65	22265	0 x2102:66	Sweep frequency starting frequency	Sweep frequency starting frequency	0~4000	Hz	0		
P2-66	22266	0 x2102:67	Sweep frequency cut-off frequency	Sweep frequency cut-off frequency	0~4000	Hz	1000		
P2-67	22267	0 x2102:68	Sweep frequency time	Sweep frequency time	0~1000	s	10		
P2-68	22268	0 x2102:69	Sweep frequency current excitation amplitude	Sweep frequency current excitation amplitude	0~100	%	30		
P2-69~ P2-99	22269~ 22299	0 x2102:70~0x 2102:100	Reserved	Reserved	0~ 65535		0		

6.1.3.4 Function Parameter Group

P3 group	Function Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P3-00~ P3-17	22300~ 22317	0 x2103:01~ 0 x2103:18	Reserved	Reserved	0~ 65535		0		
P3-18	22318	0 x2103:19	DO1 function Settings	Units&tens: function Settings 00:No function 01:Axis 1 ready status 02:Axis 2 ready status 03:Axis 3 ready status 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 0 A: EtherCAT virtual output DO1 0 B: EtherCAT virtual output DO2 0 C: EtherCAT virtual output DO3 0 D: EtherCAT virtual output DO4 0 E: EtherCAT virtual output DO5 0 F: EtherCAT virtual output DO6 10: EtherCAT virtual output DO7 11: EtherCAT virtual output DO8 Hundreds&thousandths: 00:Positive logic 01:Anti logic	0 x0000~ 0 x0111		0 x0000		
P3-19	22319	0 x2103:20	DO2 function Settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-20	22320	0 x2103:21	DO3 function settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-21	22321	0 x2103:22	DO4 function settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-22	22322	0 x2103:23	DO5 function settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-23	22323	0 x2103:24	DO6 function settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-24	22324	0 x2103:25	DO7 function settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-25	22325	0 x2103:26	DO8 function settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-26~ P3-99	22326~ 22399	0 x2103:27~ 0 x2103:100	Reserved	Reserved	0~ 65535		0		

6.1.3.5 Monitoring Parameter Group

d0 group	Monitoring Parameter Group				
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Unit
d0-00	32000	0 x3100:01	Motor speed		rpm
d0-01	32001	0 x3100:02	Reserved		
d0-02	32002	0 x3100:03	DIDO status monitoring	The low 8 bits indicate DI1 to DI8, and the high 8 bits indicate DO1 to DO8	
d0-03	32003	0 x3100:04	Low-order bits of encoder position feedback		
d0-04	32004	0 x3100:05	High-order bits of encoder position feedback		
d0-05	32005	0 x3100:06	Position bias		
d0-06	32006	0 x3100:07	q-axis voltage		
d0-07	32007	0 x3100:08	Bus synchronization correction cycle	Bus synchronization correction cycle	
d0-08	32008	0 x3100:09	d-axis voltage		
d0-09	32009	0 x3100:10	Average load rate		
d0-10	32010	0 x3100:11	Multi-circle position		
d0-11	32011	0 x3100:12	The encoder obtains the motor code	The encoder obtains the motor code	
d0-12	32012	0 x3100:13	Position instruction high position		
d0-13	32013	0 x3100:14	Position instruction low position		
d0-14	32014	0 x3100:15	Reserved		
d0-15	32015	0 x3100:16	Electrical angle of motor		
d0-16	32016	0 x3100:17	Bus voltage		0.1 V
d0-17	32017	0 x3100:18	Historical lowest bus voltage		0.1 V
d0-18	32018	0 x3100:19	Historical highest bus voltage		0.1 V
d0-19	32019	0 x3100:20	Drive temperature		0.1 °C
d0-20	32020	0 x3100:21	Encoder fault count		
d0-21	32021	0 x3100:22	Target position high position		
d0-22	32022	0 x3100:23	Target position low position		
d0-23~ d0-27	32023~ 32027	0 x3100:24~ 0 x3100:28	Reserved		
d0-28	32028	0 x3100:29	Motor overload rate	Motor overload rate	%
d0-29~ d0-32	32029~ 32032	0 x3100:30~ 0 x3100:33	Reserved		
d0-33	32033	0 x3100:34	The original value of the U-phase current sampling		
d0-34	32034	0 x3100:35	The original value of the V-phase current sampling		
d0-35	32035	0 x3100:36	Reserved		
d0-36	32036	0 x3100:37	Motor torque feedback		%
d0-37	32037	0 x3100:38	Reserved		
d0-38	32038	0 x3100:39	Motor torque setting		%
d0-39~ d0-50	32039~ 32050	0 x3100:40~ 0 x3100:51	Reserved		
d0-51	32051	0 x3100:52	Maximum communication cycle of EtherCAT		
d0-52	32052	0 x3100:53	Real-time communication cycle of EtherCAT		
d0-53~ d0-91	32053~ 32091	0 x3100:54~ 0 x3100:92	Reserved		
d0-92	32092	0 x3100:93	ECT output port CRC error count	ECT output port CRC error count	
d0-93	32093	0 x3100:94	ECT output port receives error count	ECT output port receives error count	
d0-94	32094	0 x3100:95	ECT output port forwarding error count	ECT output port forwarding error count	
d0-95	32095	0 x3100:96	ECT output port frame drop count	ECT output port frame drop count	
d0-96	32096	0 x3100:97	Reserved		
d0-97	32097	0 x3100:98	Software version - year		
d0-98	32098	0 x3100:99	Software version - Month/Day		
d0-99	32099	0 x3100:100	Software version-SN		

6.1.3.6 Alarm Code and Description

ErrCode	Alarm Code and Description				
Function Codes	EtherCAT encoding	Function Code Name	Fault principle	Exclusion method	Can it be reset
Er.001	0 xFF01	Emergency stop alarm	Emergency stop function enabled (P0-18=1), signal invalid	1,Check the external emergency stop circuit 2,Check whether the hundred-bit logic of the DI function parameters is consistent with the external signal logic. 3,Whether the 24 V power supply and the access signal are of the same origin	Y
Er.002	0 xFF02	Overcurrent	A large current exceeding the detection threshold was collected	1,Check whether the motor code is correct 2,Check whether the encoder cable corresponds to the motor 3,Check for interphase short circuits in UVW and short circuits to ground 4,After unplugging the power line and repowering, the driver still gave an alarm and needs to be returned to the factory for inspection Note:This alarm can be cleared after restoring power to the unit	N
Er.003	0 xFF03	Reserved			
Er.004	0 xFF04	Internal communication anomaly	Abnormal internal communication drive	Need to return to the factory for repair	
Er.005	0 xFF05	Overload	The motor current exceeds the rated current and runs for a long time	1,Check whether the motor code is correct 2,Check whether the encoder cable corresponds to the motor and whether the UVW phase sequence is correct 3,Check whether the motor brake is normally open 4,Check whether the resistance of the motor or mechanical structure is too large 5,The motor selection is too small. Recalculate the motor selection	Y
Er.006	0 xFF06	Reserved			
Er.007	0 xFF07	Driver initialization in progress	Driver initialization failed and current sampling is abnormal	1,Check whether the bus voltage is normal 2,Check whether the power line is short-circuited to ground 3,Check if the motor is damaged and has a three-phase resistance imbalance 4,The wrong firmware version was installed on the drive	Y
Er.008	0 xFF08	Reserved			
Er.009	0 xFF09	Abnormal three-phase current	The motor current is abnormal, and the feedback current is inconsistent with the command current	1,Check if the motor power line is connected, if the UVW phase sequence is correct, if there are any missing phases, and if the motor code is correct 2,Check if the gain is too large 3,Check if the bus voltage is too low and the motor cannot reach its maximum speed	Y
Er.010	0 xFF0A	Reserved			
Er.011	0 xFF0B	Bus undervoltage	Bus voltage below limit value	1,Check whether the input power supply voltage is too low 2,Check whether the grid voltage fluctuates greatly	Y
Er.012	0 xFF0C	Bus overvoltage	Bus voltage exceeds the limit value	1,Check whether the grid voltage is too high 2,Check whether the connection of the braking resistor is reliable and whether it meets the specifications	Y
Er.013	0 xFF0D	Position instruction too large	The speed of the position command issued by the controller exceeds 12,000 revolutions within the speed cycle	1,Check whether the control instructions are reasonable 2,Check whether the electronic gear Settings are reasonable 3,Check whether the zero point of the controller is correct	Y
Er.014	0 xFF0E	Reserved			
Er.015	0 xFF0F	Drive overheating	The sensor detects that the temperature exceeds the limit value	1,Check whether the cooling fan is working properly 2,Check whether the heat dissipation of the electrical cabinet is reasonable 3,Abnormal temperature sampling, check the temperature display D0-19. If the deviation value is large, it needs to be returned to the factory for testing	Y

ErrCode	Alarm Code and Description				
Function Codes	EtherCAT encoding	Function Code Name	Fault principle	Exclusion method	Can it be reset
Er.016	0 xFF10	Failed to write the EEPROM	EEPROM data error	1,Restore factory settings 2,Reset the parameters 3,After restoring the factory settings, the parameters cannot be saved and need to be returned to the manufacturer for testing	Y
Er.017	0 xFF11	Failed to read the EEPROM	EEPROM data error	1,Restore factory settings 2,Reset the parameters 3,After restoring the factory settings, the parameters cannot be saved and need to be returned to the manufacturer for testing	Y
Er.018	0 xFF12	Excessive positional deviation	The actual position deviation is greater than the set position deviation limit	1,Check whether the servo motor can move normally 2,Check whether the servo speed and torque are limited 3,Check whether the command speed of the controller exceeds the maximum speed of the motor 4,The position deviation limit is set too small 5,Check the DC bus voltage. When the voltage is too low, the motor speed cannot reach the maximum value	Y
Er.019	0 xFF13	Reserved			
Er.020	0 xFF14	Encoder error	The encoder failed to communicate continuously for multiple times	1,The encoder wiring definition is incorrect 2,Check whether the encoder wiring is reliable 3,Check whether the grounding of the electrical cabinet is reliable 4,Check whether the specifications of the wires Compliance Standardss	Y
Er.021	0 xFF15	Abnormal speed measurement	The single-turn encoder data is abnormal	Replace the motor	Y
Er.022	0 xFF16	The encoder is being initialized	The communication between the servo and the motor encoder has not been established	1,The motor encoder line is not connected 2,Check whether the wiring of the motor encoder is correct 3,Check whether the motor code is correct (The encoder protocol corresponding to the motor code is abnormal) 4,The firmware version of the drive is incorrect 5,Replace the motor	Y
Er.023	0 xFF17	Reserved			
Er.024	0 xFF18	External associated alarm	After setting the associated alarm (the tens digit of P0-18 is 1), there are alarms for other axes in the multi-axis drive	Check other alarm axes and investigate the cause of the alarm	Y
Er.025	0 xFF19	Reserved			
Er.026	0 xFF1A	Reserved			
Er.027	0 xFF1B	EEPROM parameter verification on error	EEPROM initialization error	1,Restore factory settings 2,Reset the parameters 3,After restoring the factory settings, the parameters cannot be saved and need to be returned to the manufacturer for testing	Y
Er.028	0 xFF1C	Reserved			
Er.029	0 xFF1D	Reserved			
Er.030	0 xFF1E	Reserved			
Er.031	0 xFF1F	The alarm clearing is too frequent	The time interval for clearing the alarm is too short	Prioritize investigating the cause of the alarm, and clear the alarm after troubleshooting	Y
Er.032	0 xFF20	Parameter initialization error	EEPROM initialization error	Restore factory settings	Y
Er.033	0 xFF21	EtherCAT communication error	Network communication error	1,The main station is not connected or disconnected 2,Check the material and specification of the network cable and whether the connection is reliable, or replace the network cable for testing 3,When the network cable is interfered with, avoid strong current and check whether the grounding of the electrical cabinet is good	Y

ErrCode	Alarm Code and Description				
Function Codes	EtherCAT encoding	Function Code Name	Fault principle	Exclusion method	Can it be reset
Er.034	0 xFF22	Battery failure	The voltage of the encoder battery is below the threshold	1,Replace the encoder battery 2,Check whether the wiring of the encoder battery is correct and whether the contact is reliable Note: After the fault is reset, an alarm will be triggered again one minute after operation.	Y
Er.035	0 xFF23	Reserved			
Er.036	0 xFF24	Multiple circles lost	Encoder multi-turn position data was lost due to the battery voltage falling below the threshold	1,Replace the encoder battery 2,Check whether the wiring of the encoder battery is correct and whether the contact is reliable. Note: When an alarm occurs, DS402 statusword bit3=1, and setting controlword to 0x80 cannot clear the alarm. You need to set controlword bit 12 to 1 to clear it. After successful clearing, statusword bit3=0	Y
Er.037	0 xFF25	Reserved			
Er.038	0 xFF26	Motor code recognition error	After enabling the automatic motor code recognition, the motor code recognition does not match the model	1,Connect the motor to the drive of the corresponding power module 2,Turn off the automatic recognition of the motor code (set the P0-9 thousands to 0), and manually set the motor code	Y
Er.039	0 xFF27	Reserved			
Er.040	0 xFF28	Abnormal speed measurement of encoder	Speed readings from both communication encoders are in excess of 15,000 rpm	1,Replace the motor	Y
Er.041	0 xFF29	Reserved			
Er.042	0 xFF2 A	Motor runaway	There is a serious deviation between the speed command and the speed feedback in the position mode	1,Check whether the motor code is correct 2,Check the motor wiring 3, Replace the motor	Y
Er.043	0 xFF2B	Reserved			
Er.044	0 xFF2C	Instantaneous current overload	Current sampling data exceeds the overload threshold instantaneously	1,Check whether the motor code is correct 2,Check whether the motor circuit is correct and whether it is short-circuited to ground 3,Increase the servo gain parameter	Y
Er.045	0 xFF2D	Reserved			
Er.046	0 xFF2E	Instantaneous overcurrent	Current sampling data instantly exceeds overcurrent threshold	1,Check whether the motor code is correct 2,Check whether the motor circuit is correct and whether it is short-circuited to ground 3,Increase the servo gain parameter	Y
Er.047	0 xFF2F	Reserved			
Er.048	0 xFF30	The power line is not connected	The motor wire is not connected	The motor power line has poor contact or is not connected	Y
Er.049	0 xFF31	Reserved			
Er.050	0 xFF32	Positive limit trigger	Positive limit alarm function triggered	1,Check whether the function definition of the DI terminal matches the external signal 2,Check the external forward limit signal 3,The device has reached the forward limit position and needs to be moved away from the limit signal	Y
Er.051	0 xFF33	Negative limit trigger	Negative limit alarm function triggered	1,Check whether the function definition of the DI terminal matches the external signal Check the external negative limit signal 2,The device has reached the negative limit position and needs to be moved away from the limit signal	Y
Er.052	0 xFF34	Double STO trigger	Both channels of the Safe Torque Off (STO) are triggered	Check the wiring of the two safety circuits	Y
Er.053	0 xFF35	STO1 trigger	First-channel safety torque shutoff trigger	Check the wiring of the first safety circuit	Y
Er.054	0 xFF36	STO2 trigger	Second channel safety torque shutoff trigger	Check the wiring of the second safety circuit	Y
Er.055	0 xFF37	STO detection	Safety torque shutoff	Please consult the manufacturer's personnel	Y

ErrCode	Alarm Code and Description				
Function Codes	EtherCAT encoding	Function Code Name	Fault principle	Exclusion method	Can it be reset
		error	hardware detection error		
Er.056	0 xFF38	Anti-collision signal trigger	Anti-collision signal trigger	Check the status of the external anti-collision signal and the wiring.	Y
Er.057~ Er.100	0 xFF31~ 0 xFF64	Reserved			
Er.227	0 xFFE3	Hardware encryption error	The drive has not undergone hardware decryption or uses pirated hardware	Please consult the manufacturer's personnel	N

6.1.4 Drive Module Axis 3 Servo Parameter Group

6.1.4.1 Basic Parameter Group

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P0-00	24000	0 x2200:01	Software version	Software version	0~65535		1000	R	
P0-01	24001	0 x2200:02	Driver model	4:S5R0(5 A)220 V 5:S8R0(8 A)220 V 6:S015(15 A)220 V 7:T6R0(6 A)380 V 8:T8R5(8.5 A)380 V 9:T12 R(12 A)380 V 10:T20 R(20 A)380 V 11:T25 R(25 A)380 V 12:T35 R(35 A)380 V	4~12		4	■	
P0-02	24002	0 x2200:03	Motor code	Motor ID:1000~3500	1000~3500		1400	■	
P0-03	24003	0 x2200:04	Parameter management	Units and tens: Reserved Hundreds: Restore factory parameters 0:no action 1:Restore factory Settings (automatically reset to zero upon completion) Thousands: Reserved	0 x0000~ 0 x1111		0 x0000	H/■	P. S.T
P0-04	24004	0 x2200:05	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	0 x2200:06	Maximum speed threshold	0~6000	0~6000	rpm	4500		
P0-06	24006	0 x2200:07	Forward maximum torque limit	0~300	0~300	%	300		
P0-07	24007	0 x2200:08	Reverse maximum torque limit	0~300	0~300	%	300		
P0-08	24008	0 x2200:09	Motor direction logic	0: CCW direction is the positive rotation direction 1: CW direction is the positive rotation direction	0~1		0	■	
P0-09	24009	0 x2200:10	Encoder type setting	Units:encoder type 0:Incremental type, 1:Multi-turn absolute value type 2:Single-turn absolute value type Tens:	0 x0000~ 0 x2113				

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
				Bit0: 0:Disable Speed Detection Alarm 1:Enable Speed Detection Alarm Bit1: 0:Disable Overspeed Alarm 1:Enable Overspeed Alarm Bit2: 0:Disable Software Short-Circuit Alarm 1:Enable Software Short-Circuit Alarm Hundreds: Bit4: 0:EtherCAT speed unit selected in rpm 1:EtherCAT speed unit selected in pp/s Thousands:Motor code recognition					
P0-10	24010	0 x2200:11	Control Mode	0:TRQ 1:SPD 2:POS 3:EtherCAT 4:Gantry Follow Mode	0~13		0		PS
P0-11	24011	0 x2200:12	Brake ON delay time	Delay Time from Servo-On Command to Brake Engagement	100~500	ms	100	■	P. S.T
P0-12	24012	0 x2200:13	Stationary state, brake OFF-servo OFF delay	Delay Time from Servo-Off Command to Motor Power-Off	1~1000	ms	100	■	P. S.T
P0-13	24013	0 x2200:14	Reserved						
P0-14	24014	0 x2200:15	Reserved						
P0-15	24015	0 x2200:16	Overload protection coefficient of motor	10~100	10~100	%	50		
P0-16	24016	0 x2200:17	USB monitoring settings	Units:USB low-speed monitoring sampling interval, unit ms (0-5) Tens:USB monitoring mode setting0:Turn off monitoring 1:Low speed monitoring 2:High speed monitoring, sampling frequency 8k 3:High speed monitoring, sampling frequency 16k Hundreds:Reserved Thousands:Reserved	0 x0000~ 0 x0035		0 x0000	H/■	P. S.T
P0-17	24017	0 x2200:18	The keyboard enables control of characters	0:Servo OFF, 1:Servo ON	0~1		0	■	
P0-18	24018	0 x2200:19	External emergency stop control	Units:External emergency stop alarm detection enable 0:Do not detect external emergency stop signals 1:Detecting external emergency stop signals Tens:Associated alarm enable	0 x0000~ 0 x0011		0	■	

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
				0:Do not enable associated alarm 1:Enable associated alarm					
P0-19	24019	0 x2200:20	Reserved						
P0-20	24020	0 x2200:21	Load inertia ratio	The ratio of load inertia to motor inertia	0~3000	%	100		S
P0-21	24021	0 x2200:22	Speed loop gain	The larger the response, the faster it will be, and if it is too large, it will cause vibration The position mode and position loop gain are adjusted in coordination	20~20000	0.1 Hz	800		S
P0-22	24022	0 x2200:23	The integral time constant of the velocity loop	The larger the integral, the stronger the integration effect, and the stronger the speed tracking ability, which needs to be coordinated with the speed loop gain and position loop gain	0~20000	0.1 Hz	10		S
P0-23	24023	0 x2200:24	Position loop gain	The larger the response, the faster it will be, and if it is too large, it will cause vibration The position mode and position loop gain are adjusted in coordination	20~20000	0.1 Hz	200		P
P0-24	24024	0 x2200:25	Second speed loop gain	The larger the response, the faster it will be, and if it is too large, it will cause vibration The position mode and position loop gain are adjusted in coordination	20~20000	0.1 Hz	800		S
P0-25	24025	0 x2200:26	The integral time constant of the second velocity loop	The smaller the integration, the stronger the effect, and the stronger the speed tracking ability, which needs to be coordinated with the speed loop gain and position loop gain	20~1000.0	0.1 Hz	125		S
P0-26	24026	0 x2200:27	Second position loop gain	The larger the response, the faster it will be, and if it is too large, it will cause vibration The position mode and position loop gain are adjusted in coordination	20~200 0.0	0.1 Hz	200		P
P0-27	24027	0 x2200:28	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	0 x0000~ 0 x1111		0	■	P

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
				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					
P0-28	24028	0 x2200:29	Speed feedforward gain	Increasing can reduce the steady-state position deviation, but if it is too large, it can lead to overshoot	0~100	%	0		P
P0-29	24029	0 x2200:30	Speed feedforward smoothing filter constant	Smooth the velocity feedforward quantity and adjust it in coordination with the velocity feedforward gain	0~64.0	ms	0		P
P0-30	24030	0 x2200:31	Reserved	Reserved	50~1000		100		P
P0-31	24031	0 x2200:32	DI1 function	Units&tens: 00~05:Reserved 08:Emergency stop 09:Axis 1 origin switch 0 A:Axis 2 origin switch 0 B:Axis 3 origin switch 0 C:Axis 1 positive limit 0 D:Axis 2 positive limit 0 E:Axis 3 positive limit 0 F: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	0 x0000~ 0 x0117		000 E		
P0-32	24032	0 x2200:33	DI2 function	Same as P0-31	0 x0000~ 0 x0117		0011		
P0-33	24033	0 x2200:34	DI3function	Same as P0-31	0 x0000~ 0 x0117		000 B		
P0-34	24034	0 x2200:35	DI4function	Same as P0-31	0 x0000~ 0 x0117		0014		
P0-35	24035	0 x2200:36	DI5 function	Same as P0-31	0 x0000~ 0 x0117		0017		
P0-36	24036	0 x2200:37	Reserved	Reserved					
P0-37	24037	0 x2200:38	DI filtering time (DI1~DI6)	0~32 ms	0~32		0		
P0-38	24038	0 x2200:39	Electronic gear selection	0:Set value using object dictionary 0x6091 1:Use the values of P0-39(high bits) and P0-40 (low bits)	0~1		0		
P0-39	24039	0 x2200:40	Number of	0~20000	0~2000		838	■	P

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
			position command pulses corresponding to one rotation of the motor (high position)		0				
P0-40	24040	0 x2200:41	Number of position command pulses corresponding to one rotation of the motor (low position)	0~9999 Pulse per revolution=(P0-39)*10000+(P0-40)	0~9999		8608	■	P
P0-41	24041	0 x2200:42	Moving average filter constant	--	0~200.0	ms	0		P
P0-42	24042	0 x2200:43	First order low-pass filter constant	--	0~6000.0	ms	0		P
P0-43	24043	0 x2200:44	Reserved	--	0~65535		0	L	P
P0-44	24044	0 x2200:45	Reserved	--	0~16384				
P0-45	24045	0 x2200:46	Reserved	--	0~65535		10000	L	P
P0-46	24046	0 x2200:47	Reserved	--	0~16384		0		
P0-47	24047	0 x2200:48	Reserved	--	4~16384		2500	■	P
P0-48	24048	0 x2200:49	Reserved	--	0 x0000~0 x0001		0 x0000	H/■	P
P0-49	24049	0 x2200:50	Position deviation limit	0.1~50.0 turns	0.1~50.0		10.0	■	
P0-50	24050	0 x2200:51	EtherCAT synchronization cycle	1~256(x0.125 ms)=[0.125 ms~32 ms]	1~256	0.125/ms	8		
P0-51	24051	0 x2200:52	Quadrant Protuberance CCW Compensation Value	0~1000‰	0~1000		0		
P0-52	24052	0 x2200:53	Quadrant Protuberance CW Compensation Value	0~1000‰	0~1000		0		
P0-53	24053	0 x2200:54	Quadrant Protuberance Compensation Delay Time	0~1000 ms	0~1000		0		
P0-54	24054	0 x2200:55	Quadrant Protuberance Compensation Filtering	0~100 ms	0~100		0		
P0-55	24055	0 x2200:56	Gravity compensation value	0~1000‰	0~1000		0		
P0-56	24056	0 x2200:57	Gravity compensation polarity	0: CCW direction compensation 1: CW direction compensation	0~1		0		
P0-57	24057	0 x2200:58	Notch filter frequency	10-5000 Hz	10~5000		100		
P0-58	24058	0 x2200:59	Notch filter depth	0~20	0~20		10		
P0-59	24059	0 x2200:60	Notch filter gain	0~500%	0~500		0		
P0-60	24060	0 x2200:61	Zero offset of the magnetic pole	0~2048,<<12	0~2048		253		

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P0-61	24061	0 x2200:62	Speed command (for debugging)	Speed command reference set by Pn parameter	0~4500	rpm	100		
P0-62~P0-64	24062~24064	0 x2200:63~0 x2200:65	Reserved						
P0-65	24065	0 x2200:66	Ud-Kp	130	0~800		50		
P0-66	24066	0 x2200:67	Ud-Ki	25	0~500		25		
P0-67	24067	0 x2200:68	Uq-Kp	130	0~300		50		
P0-68	24068	0 x2200:69	Uq-Ki	25	0~300		25		
P0-69	24069	0 x2200:70	Reserved						
P0-70	24070	0 x2200:71	Speed command polarity	0~1	0~1		0		
P0-71	24071	0 x2200:72	Servo adaptive rigidity	20~20000(Prevent nodding phenomenon during the enabling process under gravity or load conditions)	0~20000		1200	▲	
P0-72	24072	0 x2200:73	The first set of gain speed inflection points	/	0~6000	rpm	6000		
P0-73	24073	0 x2200:74	The second set of gain speed inflection points	/	0~6000	rpm	6000		
P0-74~P0-79	24074~24079	0 x2200:75~0 x2200:80	Reserved						
P0-80	24080	0 x2200:81	One-click Aging Parameters		0~6		0		
P0-81	24081	0 x2200:82	Internal function switch	Units:DC Bus Voltage Linked Adjustment Enable 0:Close 1:Enable Tens:Dead zone compensation enable 0:Close 1:Enable Hundreds:Peak current suppression 0:Close 1:Enable Thousands:Reserved 0:Normal mode	0 x0000~0 x111		0 x0000	H	P. S.T
P0-82	24082	0 x2200:83	Manufacturer calibration mode	Units:Manufacturer's current calibration mode 0:Close 1:Enable,The motor is only used for internal calibration by the manufacturer others:Reserved	0 x0000~0 x0001		0 x0000	H	PST
P0-83	24083	0 x2200:84	Reserved						
P0-84	24084	0 x2200:85	VDC calibration	27800~37683	27800~37683		27800	K	P. S.T
P0-85	24085	X2200:86	High position of serial number (first test year)	2015~2029	2015~2029		2017	K	P. S.T
P0-86	24086	0 x2200:87	Median of serial number (first test month day)	0101~1231	0101~1231		907	K	P. S.T
P0-87	24087	0 x2200:88	Low position of serial number (first test serial number)	0 x0000~0xFFFF	0 x0000~0xFFFF		0 x0000	H/K	P. S.T
P0-88	24088	0 x2200:89	Single-board tooling test QC	0 xA7E3:Pass Others:NG	0 x0000~		0 x0000	H/K	P. S.T

P0 group	Basic Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
			label		0 xFFFF				
P0-89	24089	0 x2200:90	Pre-aging QC test label	0 x8F68:Pass Others:NG	0 x0000~ 0 xFFFF		0 x0000	H/K	P. S.T
P0-90	24090	0 x2200:91	12-hour aging test label	0 x5A5 A:Pass Others:NG	0 x0000~ 0 xFFFF		0 x0000	H/K	P. S.T
P0-91	24091	0 x2200:92	Post-aging final test label	0 xB80F:Pass Others:NG	0 x0000~ 0 xFFFF		0 x0000	H/K	P. S.T
P0-92	24092	0 x2200:93	Function Password	E5DA:Clear the multi-turn values of the encoder	0 x0000~ 0 xFFFF		0 x0000	H/K	P. S.T
P0-93	24093	0 x2200:94	Reserved						
P0-94	24094	0 x2200:95	Reserved	Reserved					
P0-95	24095	0 x2200:96	Reserved	Reserved	0 x0000~ 0 xFFFF		0 x0000	H/K	P. S.T
P0-96	24096	0 x2200:97	Reserved	Reserved	0 x0000~ 0 xFFFF		0 x0000	H/R/K	P. S.T
P0-97	24097	0 x2200:98	Reserved	Reserved	0 x0000~ 0 xFFFF		0 x0000	H/R/K	P. S.T
P0-98	24098	0 x2200:99	Reserved	Reserved	0 x0000~ 0 xFFFF		0 x0000	H/R/K	P. S.T
P0-99	24099	0 x2200:100	Reserved	Reserved	0 x0000~ 0 xFFFF		0 x0000	H/K	

6.1.4.2 Advanced Commissioning Parameter Group

P1 group	Advanced Commissioning Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P1-00	24100	0 x2201:01	Self-Tuning Mode	0:Manual adjustment 1:Rigidity grade adjustment 2:Position loop bandwidth + inertia self-tuning (slow change) 3:Position loop bandwidth + inertia self-tuning (rapid change)	0~3		0		
P1-01	24101	0 x2201:02	Rigidity grade	Rigidity grade setting	1~32		12		
P1-02	24102	0 x2201:03	Reserved	Reserved	0~65535		0		
P1-03	24103	0 x2201:04	Inertia Identification mode	0:Internal instruction round-trip motion mode 1:Controller command mode 2:Continuous automatic recognition	0~2		0		
P1-04	24104	0 x2201:05	Inertia Identification completion mark	0:Inertia Identification is not completed 1:The inertia identification has been completed	0~1		0		
P1-05	24105	0 x2201:06	Max Speed for Inertia Identification	Inertia Identification allows for the maximum operating speed	100~3000	rpm	1000		
P1-06	24106	0 x2201:07	Inertia Identification Acceleration Time	The time it takes for the inertia identification speed to accelerate from 0 to 5000 rpm	10~30000	ms	100		
P1-07	24107	0 x2201:08	Maximum Movement Revolutions for Inertia Identification	Permitted Travel Revolutions for Inertia Identification	1~50	r	5		
P1-08	24108	0 x2201:09	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	0 x2201:10~0 x2201:15	Reserved	Reserved	0~65535		0		
P1-15	24115	0 x2201:16	Vibration detection threshold	Vibration detection threshold	0~100		100		
P1-16	24116	0 x2201:17	Vibration detection time	Vibration detection time	0~100		50		
P1-17	24117	0 x2201:18	Frequency of the first notch filter	Notch filter frequency	0~65535		5000		
P1-18	24118	0 x2201:19	Width of the first notch filter	Notch filter width	0~65535		2		
P1-19	24119	0 x2201:20	Depth of the first notch filter	Notch filter depth	0~65535		0		
P1-20	24120	0 x2201:21	Frequency of the second notch filter	Notch filter frequency	0~65535		5000		
P1-21	24121	0 x2201:22	Width of the second notch filter	Notch filter width	0~65535		2		
P1-22	24122	0 x2201:23	Depth of the second notch filter	Notch filter depth	0~65535		0		
P1-23	24123	0 x2201:24	Frequency of the third notch filter	Notch filter frequency	0~65535		5000		
P1-24	24124	0 x2201:25	Width of the third notch filter	Notch filter width	0~65535		2		
P1-25	24125	0 x2201:26	Depth of the third notch filter	Notch filter depth	0~65535		0		P
P1-26	24126	0 x2201:27	Frequency of the fourth notch filter	Notch filter frequency	0~65535		5000		P
P1-27	24127	0 x2201:28	Width of the fourth notch filter	Notch filter width	0~65535		2		P

P1 group	Advanced Commissioning Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P1-28	24128	0 x2201:29	Depth of the fourth notch filter	Notch filter depth	0~65535		0		
P1-29	24129	0 x2201:30	Frequency of the fifth notch filter	Notch filter frequency	0~65535		5000		
P1-30	24130	0 x2201:31	Width of the fifth notch filter	Notch filter width	0~65535		2		S
P1-31	24131	0 x2201:32	Depth of the fifth notch filter	Notch filter depth	0~65535		0		S
P1-32	24132	0 x2201:33	End vibration suppression frequency	End positioning vibration suppression frequency	0~65535		2000		S
P1-33	24133	0 x2201:34	End vibration suppression frequency compensation	End vibration suppression frequency compensation	0~200		100		S
P1-34	24134	0 x2201:35	Maximum allowable field-weakening current	Maximum allowable field-weakening current	0~100		50		S
P1-35	24135	0 x2201:36	Field-Weakening enablement	0:Disable the field-weakening function 1:Enable the field-weakening function	0~1		0		S
P1-36	24136	0 x2201:37	Field-Weakening gain	Field-Weakening gain	0~300		100%		S
P1-37	24137	0 x2201:38	Field-Weakening point velocity	Activate field-weakening control speed	0~6000		4000		P
P1-38	24138	0 x2201:39	PDFF controls the gain coefficient	PDFF controls the gain coefficient	0~100		100		
P1-39	24139	0 x2201:40	Reserved						
P1-40	24140	0 x2201:41	Reserved						T
P1-41	24141	0 x2201:42	Reserved						T
P1-42	24142	0 x2201:43	Disturbance compensation time coefficient	Disturbance compensation time coefficient	0~40000	0.1 Hz	15.0		T
P1-43	24143	0 x2201:44	Disturbance cut-off frequency	Disturbance cut-off frequency	0~40000	0.1 Hz	400.0		T
P1-44	24144	0 x2201:45	Disturbance compensation gain	Disturbance compensation gain	0~100	%	0.0		T
P1-45	24145	0 x2201:46	Disturbance observer inertia correction coefficient	Disturbance observer inertia correction coefficient	0~3000	%	100		
P1-46	24146	0 x2201:47	Model tracking control mode	0:Do not use model tracking control 1:Enable model tracking control+rigid body model 2:Enable model tracking control+dual inertia model	0~300	%	10		
P1-47	24147	0 x2201:48	Model tracking control gain	Model tracking control gain	0~30000	0.1 Hz	400		
P1-48	24148	0 x2201:49	Model tracking control compensation gain	Model tracking control compensation gain	0~200	%	100		
P1-49	24149	0 x2201:50	Dual-inertia model resonance frequency	Dual-inertia model resonant frequency	1~100		1		
P1-50	24150	0 x2201:51	Dual-inertia model resonance frequency	Dual-inertia model anti-resonant frequency	100~600 0	rpm	3000		
P1-51	24151	0 x2201:52	Dual-inertia model velocity feedforward value	Dual-inertia model velocity feedforward value	0~100	%	0		
P1-52	24152	0 x2201:53	Dual-inertia model torque feedforward value	Dual-inertia model torque feedforward value	0~100	%	0		

P1 group	Advanced Commissioning Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P1-53	24153	0 x2201:54	Reserved						
P1-54	24154	0 x2201:55	Reserved						
P1-55	24155	0 x2201:56	Torque ripple suppression frequency	Torque ripple suppression frequency	1~50000	0.1 Hz	400		
P1-56	24156	0 x2201:57	Torque ripple Suppression Compensation	Torque ripple Suppression Compensation	0~100	%	0		
P1-57	24157	0 x2201:58	Torque ripple Suppression Phase	Torque ripple Suppression Phase	0~2048		0		
P1-58	24158	0 x2201:59	Torque Command Filter Cut-off Frequency	Torque Command Filter Cut-off Frequency	1~16000	Hz	4000		
P1-59~ P1-99	24159~ 24199	0 x2201:60~ 0 x2201:100	Reserved						

6.1.4.3 Motor Parameter Group

P2 group	Motor Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P2-00	24200	0 x2202:01	Rated power of the motor		1~65535	0.001 kW	75	R	
P2-01	24201	0 x2202:02	Rated current of the motor		1~65535	0.01 A	500	R	S
P2-02	24202	0 x2202:03	Maximum current of the motor		1~65535	0.01 A	500	R	S
P2-03	24203	0 x2202:04	Rated speed of the motor		100~6000	rpm	3000	R	P
P2-04	24204	0 x2202:05	Maximum speed of the motor		100~6000	rpm	6000	R	S
P2-05	24205	0 x2202:06	Rated torque of the motor		10~65535	0.01 Nm	239	R	S
P2-06	24206	0 x2202:07	Maximum torque of the motor		10~65535	0.01 Nm	716	R	S
P2-07	24207	0 x2202:08	Maximum speed torque value of motor		10~65535	0.01 Nm	716	R	P
P2-08	24208	0 x2202:09	Number of pole pairs in motor		2~100		5	R	S
P2-09	24209	0 x2202:10	Motor back electromotive force coefficient		1~65535	0.01 mV/rpm	3330	R	
P2-10	24210	0 x2202:11	Motor torque constant		1~65535	0.01 Nm/Arms	51	R	
P2-11	24211	0 x2202:12	Motor rotor inertia		1~65535	0.01 kg.cm2	130	R	
P2-12	24212	0 x2202:13	Motor D-axis inductance		1~65535	0.01 mH	387	R	
P2-13	24213	0 x2202:14	Motor Q-axis inductance		1~65535	0.01 mH	327	R	
P2-14	24214	0 x2202:15	Motor stator resistance		1~65535	0.001Ω	500	R	
P2-15	24215	0 x2202:16	Electrical time constant of the motor		1~65535	0.01 ms	654	R	
P2-16	24216	0 x2202:17	Mechanical time constant of the motor		1~65535	0.01 ms	24	R	
P2-17	24217	0 x2202:18	Zero offset of the motor		1~65535		205	R	
P2-18~ P2-99	24218~ 24299	0 x2202:19~0x 2202:100							

6.1.4.4 Function Parameter Group

P3 group	Function Parameter Group								
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Setting Range	Unit	Factory Default	Attribute	Associated pattern
P3-00~ P3-17	24300~ 24317	0 x2203:01~0 x2203:18	Reserved	Reserved	0~ 65535		0		
P3-18	24318	0 x2203:19	DO1 function settings	Units&tens: function settings 00:No function 01:Axis 1 ready status 02:Axis 2 ready status 03:Axis 3 ready status 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 0 A:EtherCAT virtual output DO1 0 B:EtherCAT virtual output DO2 0 C:EtherCAT virtual output DO3 0 D:EtherCAT virtual output DO4 0 E:EtherCAT virtual output DO5 0 F:EtherCAT virtual output DO6 10:EtherCAT virtual output DO7 11:EtherCAT virtual output DO8 Hundreds&thousandths: 00:Positive logic 01:Anti logic	0 x0000~ 0 x0111		0 x0000		
P3-19	24319	0 x2203:20	DO2 function settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-20	24320	0 x2203:21	DO3 function settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-21	24321	0 x2203:22	DO4 function settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-22	24322	0 x2203:23	DO5 function settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-23	24323	0 x2203:24	DO6 function settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-24	24324	0 x2203:25	DO7 function settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-25	24325	0 x2203:26	DO8 function settings	Same as P3-18	0 x0000~ 0 x0111		0 x0000		
P3-26~ P3-99	24326~ 24399	0 x2203:27~0 x2203:100	Reserved	Reserved	0~ 65535		0		

6.1.4.5 Monitoring Parameter Group

d0 group	Monitoring Parameter Group				
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Unit
d0-00	34000	0 x3200:01	Motor speed		rpm
d0-01	34001	0 x3200:02	Reserved		
d0-02	34002	0 x3200:03	DIDO status monitoring	The low 8 bits indicate DI1 to DI8, and the high 8 bits indicate DO1 to DO8	
d0-03	34003	0 x3200:04	Low-order bits of encoder position feedback		
d0-04	34004	0 x3200:05	High-order bits of encoder position feedback		
d0-05	34005	0 x3200:06	Position bias		
d0-06	34006	0 x3200:07	q-axis voltage		
d0-07	34007	0 x3200:08	Bus synchronization correction cycle	Bus synchronization correction cycle	
d0-08	34008	0 x3200:09	d-axis voltage		
d0-09	34009	0 x3200:10	Average load rate		
d0-10	34010	0 x3200:11	Multi-circle position		
d0-11	34011	0 x3200:12	The encoder obtains the motor code	The encoder obtains the motor code	
d0-12	34012	0 x3200:13	Position instruction high position		
d0-13	34013	0 x3200:14	Position instruction low position		
d0-14	34014	0 x3200:15	Reserved		
d0-15	34015	0 x3200:16	Electrical angle of motor		
d0-16	34016	0 x3200:17	Bus voltage		0.1 V
d0-17	34017	0 x3200:18	Historical lowest bus voltage		0.1 V
d0-18	34018	0 x3200:19	Historical highest bus voltage		0.1 V
d0-19	34019	0 x3200:20	Drive temperature		0.1 °C
d0-20	34020	0 x3200:21	Encoder fault count		
d0-21	34021	0 x3200:22	Target position high position		
d0-22	34022	0 x3200:23	Target position low position		
d0-23	34023	0 x3200:24	Reserved		
d0-24	34024	0 x3200:25	Reserved		
d0-25	34025	0 x3200:26	Reserved		
d0-26	34026	0 x3200:27	Reserved		
d0-27	34027	0 x3200:28	Reserved		
d0-28	34028	0 x3200:29	Motor overload rate	Motor overload rate	%
d0-29	34029	0 x3200:30	Reserved		
d0-30	34030	0 x3200:31	Reserved		
d0-31	34031	0 x3200:32	Reserved		
d0-32	34032	0 x3200:33	Reserved		
d0-33	34033	0 x3200:34	The original value of the U-phase current sampling		
d0-34	34034	0 x3200:35	The original value of the V-phase current sampling		
d0-35	34035	0 x3200:36	Reserved		

d0 group	Monitoring Parameter Group				
Function Codes	Modbus Mapped Address	EtherCAT Mapped Address	Function Code Name	Parameter Description	Unit
d0-36	34036	0 x3200:37	Motor torque feedback		%
d0-37	34037	0 x3200:38	Reserved		
d0-38	34038	0 x3200:39	Motor torque setting		%
d0-39~ d0-50	34039~ 34050	0 x3200:40~0x 3200:51	Reserved		
d0-51	34051	0 x3200:52	Maximum communication cycle of EtherCAT		
d0-52	34052	0 x3200:53	Real-time communication cycle of EtherCAT		
d0-53~ d0-91	34053~ 34091	0 x3200:54~0x 3200:92	Reserved		
d0-92	34092	0 x3200:93	ECT input port CRC error count	ECT input port CRC error count	
d0-93	34093	0 x3200:94	ECT input port receives error count	ECT input port receives error count	
d0-94	34094	0 x3200:95	ECT input port forwarding error count	ECT input port forwarding error count	
d0-95	34095	0 x3200:96	ECT input port frame drop count	ECT input port frame drop count	
d0-96	34096	0 x3200:97	Reserved		
d0-97	34097	0 x3200:98	Software version - year		
d0-98	34098	0 x3200:99	Software version - Month/Day		
d0-99	34099	0 x3200:100	Software version-SN		

6.1.4.6 Alarm Code and Description

ErrCode	Alarm Code and Description				
Function Codes	EtherCAT encoding	Function Code Name	Fault principle	Exclusion method	Can it be reset
Er.001	0 xFF01	Emergency stop alarm	Emergency stop function enabled (P0-18=1), signal invalid	1,Check the external emergency stop circuit 2,Check whether the hundred-bit logic of the DI function parameters is consistent with the external signal logic. 3,Whether the 24 V power supply and the access signal are of the same origin	Y
Er.002	0 xFF02	Overcurrent	A large current exceeding the detection threshold was collected	1,Check whether the motor code is correct 2,Check whether the encoder cable corresponds to the motor 3,Check for interphase short circuits in UVW and short circuits to ground 4,After unplugging the power line and repowering, the driver still gave an alarm and needs to be returned to the factory for inspection Note:This alarm can be cleared after restoring power to the unit	N
Er.003	0 xFF03	Reserved			
Er.004	0 xFF04	Internal communication anomaly	Abnormal internal communication drive	Need to return to the factory for repair	
Er.005	0 xFF05	Overload	The motor current exceeds the rated current and runs for a long time	1,Check whether the motor code is correct 2,Check whether the encoder cable corresponds to the motor and whether the UVW phase sequence is correct 3,Check whether the motor brake is normally open 4,Check whether the resistance of the motor or mechanical structure is too large 5,The motor selection is too small. Recalculate the motor selection	Y
Er.006	0 xFF06	Reserved			
Er.007	0 xFF07	Driver initialization in progress	Driver initialization failed and current sampling is abnormal	1,Check whether the bus voltage is normal 2,Check whether the power line is short-circuited to ground 3,Check if the motor is damaged and has a three-phase resistance imbalance 4,The wrong firmware version was installed on the drive	Y
Er.008	0 xFF08	Reserved			
Er.009	0 xFF09	Abnormal three-phase current	The motor current is abnormal, and the feedback current is inconsistent with the command current	1,Check if the motor power line is connected, if the UVW phase sequence is correct, if there are any missing phases, and if the motor code is correct 2,Check if the gain is too large 3,Check if the bus voltage is too low and the motor cannot reach its maximum speed	Y
Er.010	0 xFF0A	Reserved			
Er.011	0 xFF0B	Bus undervoltage	Bus voltage below limit value	1,Check whether the input power supply voltage is too low 2,Check whether the grid voltage fluctuates greatly	Y
Er.012	0 xFF0C	Bus overvoltage	Bus voltage exceeds the limit value	1,Check whether the grid voltage is too high 2,Check whether the connection of the braking resistor is reliable and whether it meets the specifications	Y
Er.013	0 xFF0D	Position instruction too large	The speed of the position command issued by the controller exceeds 12,000 revolutions within the speed cycle	1,Check whether the control instructions are reasonable 2,Check whether the electronic gear Settings are reasonable3,Check whether the zero point of the controller is correct	Y
Er.014	0 xFF0E	Reserved			
Er.015	0 xFF0F	Drive overheating	The sensor detects that the temperature exceeds the limit value	1,Check whether the cooling fan is working properly 2,Check whether the heat dissipation of the electrical cabinet is reasonable 3,Abnormal temperature sampling, check the temperature display D0-19. If the deviation value is large, it needs to be returned to the factory for testing	Y
Er.016	0 xFF10	Failed to write the EEPROM	EEPROM data error	1,Restore factory settings 2,Reset the parameters	Y

ErrCode	Alarm Code and Description				
Function Codes	EtherCAT encoding	Function Code Name	Fault principle	Exclusion method	Can it be reset
				3,After restoring the factory settings, the parameters cannot be saved and need to be returned to the manufacturer for testing	
Er.017	0 xFF11	Failed to read the EEPROM	EEPROM data error	1,Restore factory settings 2,Reset the parameters 3,After restoring the factory settings, the parameters cannot be saved and need to be returned to the manufacturer for testing	Y
Er.018	0 xFF12	Excessive positional deviation	The actual position deviation is greater than the set position deviation limit	1,Check whether the servo motor can move normally 2,Check whether the servo speed and torque are limited 3,Check whether the command speed of the controller exceeds the maximum speed of the motor 4,The position deviation limit is set too small 5,Check the DC bus voltage. When the voltage is too low, the motor speed cannot reach the maximum value	Y
Er.019	0 xFF13	Reserved			
Er.020	0 xFF14	Encoder error	The encoder failed to communicate continuously for multiple times	1,The encoder wiring definition is incorrect2,Check whether the encoder wiring is reliable 3,Check whether the grounding of the electrical cabinet is reliable 4,Check whether the specifications of the wires Compliance Standardss	Y
Er.021	0 xFF15	Abnormal speed measurement	The single-turn encoder data is abnormal	Replace the motor	Y
Er.022	0 xFF16	The encoder is being initialized	The communication between the servo and the motor encoder has not been established	1,The motor encoder line is not connected 2,Check whether the wiring of the motor encoder is correct 3,Check whether the motor code is correct (The encoder protocol corresponding to the motor code is abnormal) 4,The firmware version of the drive is incorrect 5,Replace the motor	Y
Er.023	0 xFF17	Reserved			
Er.024	0 xFF18	External associated alarm	After setting the associated alarm (the tens digit of P0-18 is 1), there are alarms for other axes in the multi-axis drive	Check other alarm axes and investigate the cause of the alarm	Y
Er.025	0 xFF19	Reserved			
Er.026	0 xFF1A	Reserved			
Er.027	0 xFF1B	EEPROM parameter verification on error	EEPROM initialization error	1,Restore factory settings 2,Reset the parameters 3,After restoring the factory settings, the parameters cannot be saved and need to be returned to the manufacturer for testing	Y
Er.028	0 xFF1C	Reserved			
Er.029	0 xFF1D	Reserved			
Er.030	0 xFF1E	Reserved			
Er.031	0 xFF1F	The alarm clearing is too frequent	The time interval for clearing the alarm is too short	Prioritize investigating the cause of the alarm, and clear the alarm after troubleshooting	Y
Er.032	0 xFF20	Parameter initialization error	EEPROM initialization error	Restore factory settings	Y

ErrCode	Alarm Code and Description				
Function Codes	EtherCAT encoding	Function Code Name	Fault principle	Exclusion method	Can it be reset
Er.033	0 xFF21	EtherCAT communication error	Network communication error	1,The main station is not connected or disconnected 2,Check the material and specification of the network cable and whether the connection is reliable, or replace the network cable for testing 3,When the network cable is interfered with, avoid strong current and check whether the grounding of the electrical cabinet is good	Y
Er.034	0 xFF22	Battery failure	The voltage of the encoder battery is below the threshold	1,Replace the encoder battery 2,Check whether the wiring of the encoder battery is correct and whether the contact is reliable Note: After the fault is reset, an alarm will be triggered again one minute after operation.	Y
Er.035	0 xFF23	Reserved			
Er.036	0 xFF24	Multiple circles lost	Encoder multi-turn position data was lost due to the battery voltage falling below the threshold	1,Replace the encoder battery 2,Check whether the wiring of the encoder battery is correct and whether the contact is reliable. Note: When an alarm occurs, DS402 statusword bit3=1, and setting controlword to 0x80 cannot clear the alarm. You need to set controlword bit 12 to 1 to clear it. After successful clearing, statusword bit3=0	Y
Er.037	0 xFF25	Reserved			
Er.038	0 xFF26	Motor code recognition error	After enabling the automatic motor code recognition, the motor code recognition does not match the model	1,Connect the motor to the drive of the corresponding power module 2,Turn off the automatic recognition of the motor code (set the P0-9 thousands to 0), and manually set the motor code	Y
Er.039	0 xFF27	Reserved			
Er.040	0 xFF28	Abnormal speed measurement of encoder	Speed readings from both communication encoders are in excess of 15,000 rpm	1,Replace the motor	Y
Er.041	0 xFF29	Reserved			
Er.042	0 xFF2 A	Motor runaway	There is a serious deviation between the speed command and the speed feedback in the position mode	1,Check whether the motor code is correct 2,Check the motor wiring 3, Replace the motor	Y
Er.043	0 xFF2B	Reserved			
Er.044	0 xFF2C	Instantaneous current overload	Current sampling data exceeds the overload threshold instantaneously	1,Check whether the motor code is correct 2,Check whether the motor circuit is correct and whether it is short-circuited to ground 3,Increase the servo gain parameter	Y
Er.045	0 xFF2D	Reserved			
Er.046	0 xFF2E	Instantaneous overcurrent	Current sampling data instantly exceeds overcurrent threshold	1,Check whether the motor code is correct 2,Check whether the motor circuit is correct and whether it is short-circuited to ground 3,Increase the servo gain parameter	Y
Er.047	0 xFF2F	Reserved			
Er.048	0 xFF30	The power line is not connected	The motor wire is not connected	The motor power line has poor contact or is not connected	Y
Er.049	0 xFF31	Reserved			
Er.050	0 xFF32	Positive limit trigger	Positive limit alarm function triggered	1,Check whether the function definition of the DI terminal matches the external signal 2,Check the external forward limit signal 3,The device has reached the forward limit position and needs to be moved away from the limit signal	Y
Er.051	0 xFF33	Negative limit trigger	Negative limit alarm function triggered	1,Check whether the function definition of the DI terminal matches the external signal	Y

ErrCode	Alarm Code and Description				
Function Codes	EtherCAT encoding	Function Code Name	Fault principle	Exclusion method	Can it be reset
				Check the external negative limit signal 2, The device has reached the negative limit position and needs to be moved away from the limit signal	
Er.052	0 xFF34	Double STO trigger	Both channels of the Safe Torque Off (STO) are triggered	Check the wiring of the two safety circuits	Y
Er.053	0 xFF35	STO1 trigger	First-channel safety torque shutoff trigger	Check the wiring of the first safety circuit	Y
Er.054	0 xFF36	STO2 trigger	Second channel safety torque shutoff trigger	Check the wiring of the second safety circuit	Y
Er.055	0 xFF37	STO detection error	Safety torque shutoff hardware detection error	Please consult the manufacturer's personnel	Y
Er.056	0 xFF38	Anti-collision signal trigger	Anti-collision signal trigger	Check the status of the external anti-collision signal and the wiring	Y
Er.057~ Er.100	0 xFF31~ 0 xFF64	Reserved			
Er.227	0 xFE3	Hardware encryption error	The drive has not undergone hardware decryption or uses pirated hardware	Please consult the manufacturer's personnel	N

7. Communication Protocol Description

7.1 Interface Information

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 ECAT-IN on the lower front of the driver is the input interface, and ECAT-OUT is the output interface.

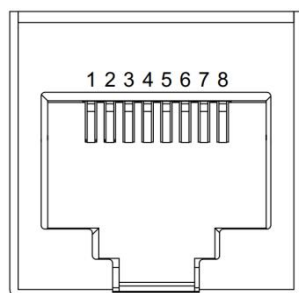


Figure 6-1 Pin definition

Table 6-1 Definition of communication signal connector pins

Pin number	Name	Function
1	TX+	Receiver signal
2	TX-	Receiver signal
3	RX+	Send a signal
4	--	--
5	--	--
6	RX-	Send a signal
7	--	--
8	--	--
/	Shell	Block

7.2 Communication cable

EtherCAT communication cables use Ethernet Category 5 (100BASE-TX) network cables or high-strength shielded network cables. When using R920 series servo drives, shielded network cables are also required to enhance anti-interference capabilities.

7.3 EMC Standard

The R920 series servo drive executes IEC/ EN61800-3:2004 (Adjustable speed electrical power drive systems-part3:) The standards (EMC requirements and specific test methods) and the national standard GB/t12668.3.

8. Simplified Commissioning Instructions

8.1 Commissioning Keypad Operation

The servo driver can perform operations such as debugging, parameter setting or modification, and monitoring of working status through its built-in keyboard. It also adopts an extensible design (with a maximum extension of 20 meters) to enable intuitive debugging within the safety zone.



Figure 6-1 Introduction to Commissioning Keypad

8.2 Keypad Key Definition

Button	Name	Function Overview
ESC	Quick exit key	Quickly exit the current interface and return to the normal monitoring interface
AXIS	Axis switching key	Used for selecting and switching axis numbers

	Parameter group switch key	Entry and exit of the first-level menu
	incremental key	Incremental data or function code
	decrement key	Data or function code decrement
	Circular Shift Construction	When modifying parameters, use the shift key to select the modification bit of the parameter
	Confirm button	Navigate through the submenus step by step and set parameters
	Stop/Reset button	In the operation panel control mode, pressing this button stops the drive operation; in fault status, pressing this button performs fault reset

8. Simplified Commissioning Instructions

1 Wiring

Connect the power line, motor line, encoder line, IO line, braking resistor line and other lines to the driver. 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 and check the status of the ERR and RUN lights on the driver. If only the RUN light is flashing, it indicates that the driver has entered a ready state. If both the RUN and ERR lights are flashing, it indicates that the driver is not ready and the encoder wiring needs to be checked.

3 Trial run

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

1>Switch to the corresponding axis through the AXIS button, for example, AXIS displays 0.0, representing the driver basic parameter debugging interface, AXIS displays 1.1,1.1-1.3 represents J1~J3 axis,2.1~2.3 represents J4~J6 axis;

2>Set P0-02 as the corresponding motor code;

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

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

5> Set P0-10 to 1 (speed mode);

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

7> Set P0-17 to 1 (current axis servo enabled), **after enabling, the motor starts and continues to rotate, and stops by pressing the "STOP/RES" key on the keyboard.**

8> Set P0-17 to 0 (current axis servo enable off);

9> Set P0-04 to 0 (allows modification of maximum torque);

10>Set P0-06 and P0-07 to 300 (maximum torque output of 300%);

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 bus control mode);

2> Check the electronic gear Settings in the 402 dictionary, namely 6091(drive 1 axis), 6891(drive axis 2 axis), 7091(drive 3 axis), and set them according to the requirements of the upper computer. It is recommended to set them to 1:1, at which point the pulse feedback of the motor per revolution is the actual number of lines of the encoder.