

R910 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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Revision History

Revision Date	Release version	Change Description
2024-05	R1.0	● First edition
2025-01	R1.1	● Updated appearance drawings, dimension drawings and terminal definitions
2025-03	R1.2	● Added wiring diagrams and function codes
2025-06	R1.3	● Adjusted model sequence of 4-axis 8A products (R910-S4A08/R910-S4B08/R910-S4C08 changed to R910-S4B08/R910-S4C08/R910-S4D08); Added R910-S4A08 ● Updated product renderings
2025-08	R1.4	● Added alarm records Err50~Err56; ● Updated outline dimension drawings and terminal definitions; ● Updated product naming rules and minor revisions
2025-09	R1.5	● Deleted parameter groups of power servo drive and monitoring parameters; ● Added alarm descriptions; ● Released new product models
2025-12	R1.6	● Deleted duplicate P0-16 and redundant parameters; ● Added Error04 alarm; ● Updated STO safety circuit wiring; ● Added brake port definition, model selection list and R910-PIO01 expansion I/O board
2026-4	R1.7	● Added operation guide for mini keypad

Contents

1. Safety Information and Precautions	6
1.1 Safety Information	6
1.1.1 Before and During Installation	6
1.1.2 Wiring	6
1.1.3 Before Power-on	7
1.1.4 After Power-on	7
1.1.5 During Operation	7
1.2 Precautions	8
1.2.1 Motor Insulation Inspection	8
1.2.2 Motor	8
1.2.3 Motor Heating and Noise	8
1.2.4 Use Outside the Rated Voltage	9
1.2.5 Contactors and Other Switching Devices at the Input and Output Ends of the Servo Drive	9
1.2.6 Altitude and Derating	10
1.2.7 Precautions When the Servo Drive Is Scrapped	10
1.2.8 Drive Precautions	10
2. Product Introduction	11
2.1 Product Features	11
2.2 Product Specifications	11
2.3 Naming Rules Naming Rule	12
2.4 Body Label Description	12
2.5 Model Selection List	13
3. Product Specifications	14
3.1 Technical Specifications	14
4. Product Dimensions	15
4.1 Drive Outline Dimensions Diagram	15
4.2 Expansion I/O Board Dimensions Diagram (R910-PIO01)	17
5. Wiring Instructions	18
5.1 Terminal Definition	18
5.2 Drive Front Terminal Wiring Instructions	19
5.3 Drive Top-Surface Terminal Wiring Instructions	24
5.4 Control Circuit Wiring Instructions	25
5.5 Expansion I/O Board Terminal Definition (R910-PIO01)	32
5.6 Expansion I/O Board Wiring Instructions (R910-PIO01)	32
5.7 Expansion I/O Board Specifications (R910-PIO01)	32
6. Function Codes	34
6.1 Function Code List of Function C	34
6.1.1 Parameter and Attribute Definitions	34
6.1.2 Drive Module Axis 1 Servo Parameter Group	36
6.1.3 Drive Module Axis 2 Servo Parameter Group	54
6.1.4 Drive Module Axis 3 Servo Parameter Group	70
7. Communication Protocol Description	87
7.1 Interface Information	87
7.2 CC	87
7.3 EMC Standard	87
8. Simplified Commissioning Instructions	88

8.1Commissioning Keypad Operation	88
8.2Keypad Key Definitions	88
8. Simplified Commissioning Instructions	89
1 Wiring	89
2 Power-on	89
3 Trial Run	89
4 EtherCAT Communication Operation	89

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 fire risk.

1.1.2 Wiring



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



- Do not connect the input power cord to the output terminals U, V and W, otherwise the servo drive may be damaged!
- Make sure that the wiring meets the EMC requirements and the

safety standards of the area; as the wire diameter, please refer to the recommendations in the manual, otherwise an accident may occur

1.1.3 Before Power-on



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

1.1.4 After Power-on



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



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

1.1.5 During Operation



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



- Never repair or maintain the equipment while 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.

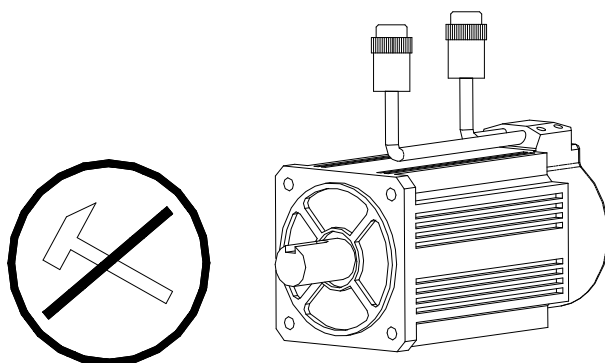
1.2 Precautions

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 500V voltage type megger to ensure that the measured insulation resistance is not less than 5mΩ.

1.2.2 Motor

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



1.2.3 Motor Heating and Noise

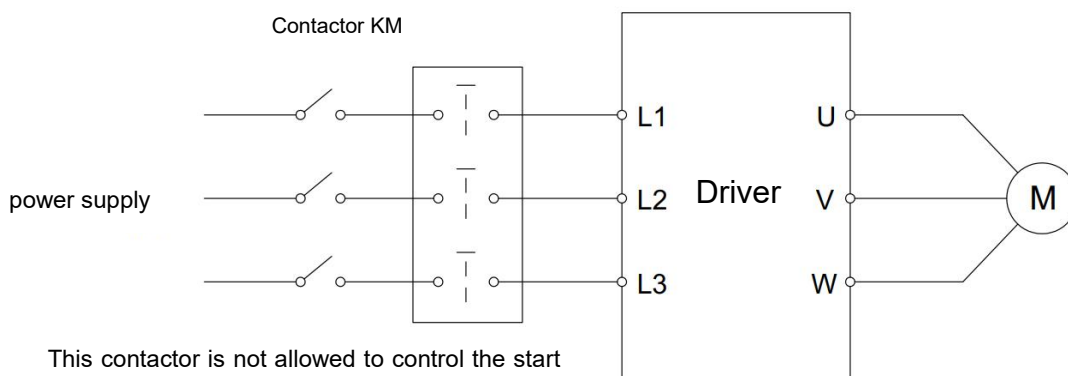
The output voltage of servo drive is PWM wave, which contains certain harmonics, so the temperature rise, noise and vibration of motor may slightly increase compared with operation at mains frequency.

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.

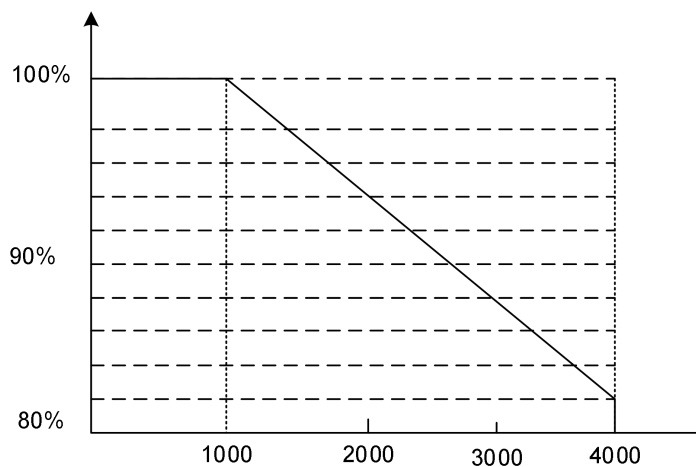


This contactor is not allowed to control the start and stop of the drive. When it must be used, the interval should not be less than 1 hour.

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.



Driver rated output current and height derating curve

Figure 1-3

1.2.7 Precautions When the Servo Drive Is Scrapped

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 will be generated when the plastic parts are burned. They should be treated as industrial waste.

1.2.8 Drive Precautions

When the drive incurs overcurrent Er.002 ~ Er.005, Er.009 ~ Er.0012 and other faults, and the fault occurs again if it is started again, perform troubleshooting, and do not restart the drive repeatedly, otherwise the drive inverter module may be damaged by the impact of large current.

2. Product Introduction

2.1 Product Features

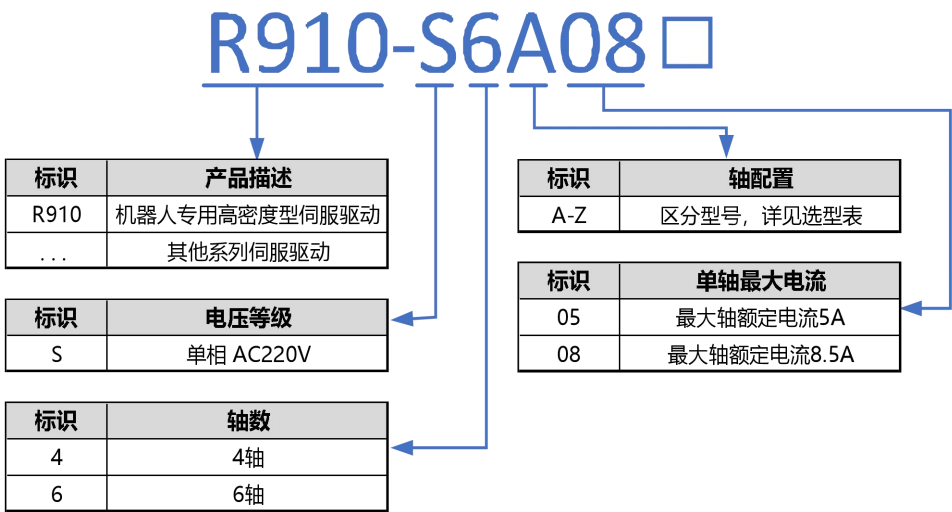
The R910 high-power-density servo drive is a high-performance multi-axis bus-type servo drive with integrated I/O, developed specifically for the robotics industry. It offers industry-leading power density and is tailored for SCARA, small six-axis, and Delta robots. It is particularly suitable for small-load robotic control cabinets in the 3C and electronics industries, where space requirements are increasingly stringent. The drive has an IP20 protection rating, and can achieve an IP54 protection rating when used with the I/O terminal protective cover in the control cabinet. Its innovative design eliminates most in-cabinet wiring harnesses, significantly improves cabinet design efficiency, enhances the reliability of robotic control cabinets, and reduces cabinet costs.

2.2 Product Specifications



High power density	Flat design, through-wall mounting, independent air duct, achieving industry-leading electrical cabinet volume;
No in-cabinet wiring harness	Innovative design achieves hard wiring inside the cabinet, eliminating most cables such as servo drive power output, encoder, brake, IO, etc., reducing panel and cabinet costs and enhancing reliability
Safe and reliable	Equipped with advanced application functions such as built-in dynamic braking and STO safe torque off, as well as safety application circuit interfaces such as robot emergency stop, enable, safety switch, and light curtain
Flexible protection	The drive has an IP20 protection level, and when paired with the protective cover for the I/O terminals in the electrical cabinet, it can easily achieve an IP54 protection level;
Exclusive algorithm	A scene-specific algorithm for robots, eliminating end-effector jitter and achieving higher trajectory accuracy
Optional I/O interface	Extensible 16DI/16DO, 32DI/32DO, eliminating the need for conventional IO boards inside the electrical cabinet

2.3 Naming Rules



2.4 Body Label Description







Model : R910-S6A08

Input : AC 220V DC 24V

Output: J1~J2:8A J3~J6:5A

SN : R910D24000545





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2.5 Model Selection List

Model	Rated Axis Current (unit: Arms)						
	Rated Voltage	Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6
R910-S6A05	220V	5	5	5	5	5	5
R910-S6A08	220V	8	8	5	5	5	5
R910-S6A10	220V	10	10	8	5	5	5
R910-S6B10	220V	10	10	5	5	5	5
R910-S6A15	220V	15	15	5	5	5	5
R910-S6B15	220V	15	15	8	5	5	5
R910-S6C15	220V	15	15	15	5	5	5
R910-S6D15	220V	15	15	10	5	5	5
R910-S6E15	220V	15	15	15	8	8	8
R910-S5A05	220V	5	5	5	5	5	/
R910-S4A05	220V	5	5	5	5	/	/
R910-S4A08	220V	8	5	5	5	/	/
R910-S4B08	220V	8	8	5	5	/	/
R910-S4C08	220V	8	8	8	5	/	/
R910-S4D08	220V	8	8	8	8	/	/

3. Product Specifications

3.1 Technical Specifications

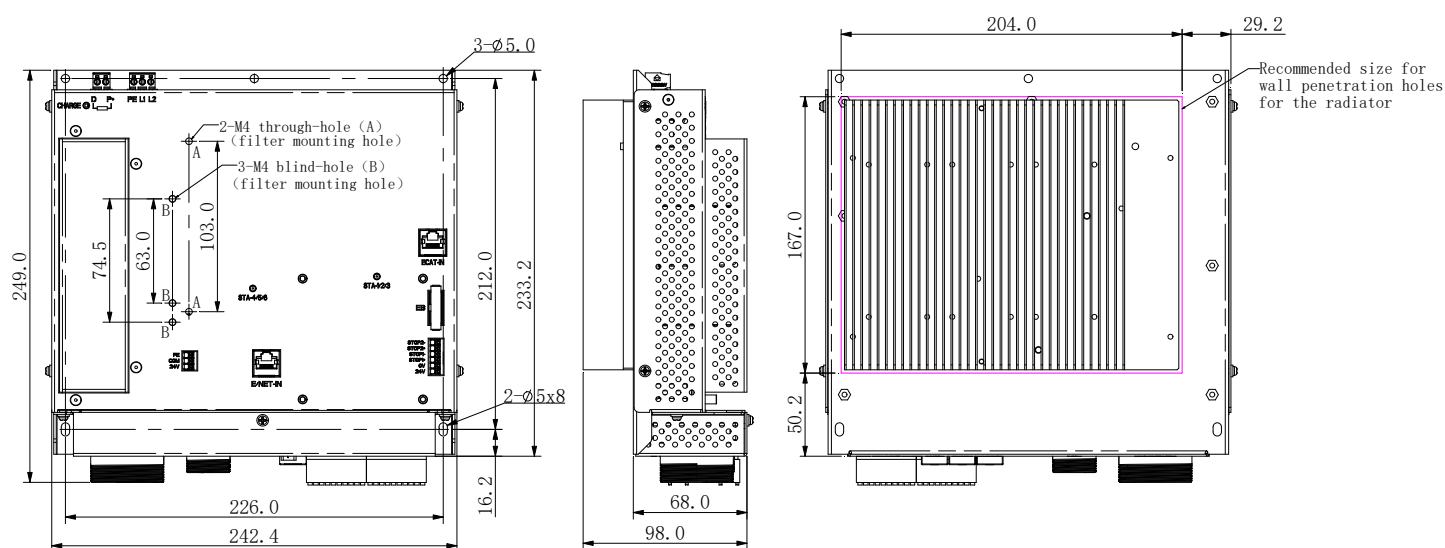
Project		Description
Basic Functions	Voltage Rating	Single-phase AC220V
	Power Range	50 W~3.8 kW
	Dynamic Braking	Standard for 220V drives
	Configuration Software	iMoto_Studio
	Brake Power Input	24V brake power input
	Brake Output Port	Direct drive of motor brake is possible when 24V motor brake current ≤ 1.5 A (no relay required); external relay drive is required when motor brake current > 1.5 A
	Brake Resistor Interface	For connecting a brake resistor
	Indicator Light	Power CHARGE indicator
	Pass-Through Ethernet Port	Reserved for controller, no LED; 1 external, 1 internal, RJ45 shielded
Bus	Control Mode	Supports speed, position, torque, and mixed control modes to meet the flexibility requirements of different application environments
I/O Interface	DI/DO	Standard 16DI/DO, expandable to 32DI/DO; supports EtherCAT bus control
Configuration Interface	Power Output Port	IP54 aviation connector, female power output
	Encoder Port	IP54 aviation connector, female
	Configuration Interface	USB Type-C port + Ethernet port + PANEL configuration keypad connection port
Communication Interface	EtherCAT IN EtherCAT OUT	Minimum communication cycle: 125 μ s; Maximum cable length: 100 m; Supports 100 Mbps full-duplex operation
Safety Interface	STO Interface + Safety Circuit	Safe torque off terminals
Mounting Method	Construction Type	Sheet metal housing + base aluminum profile heatsink
	Mounting	Through-wall mounting with independent air duct
	Cooling Method	Forced air cooling
Environment	Operating Ambient Temperature	-10 $^{\circ}$ C~45 $^{\circ}$ C

	Humidity	10%~90%RH (non-condensing)
	Storage Temperature	-20℃~65℃
	Storage Humidity	10%~90%RH (non-condensing)
	Altitude	≤ 1000 m
	Protection Rating	Drive body: IP20; After installation in control cabinet: IP54
Compliance Standards	Certifications	CE, RoHS

4. Product Dimensions

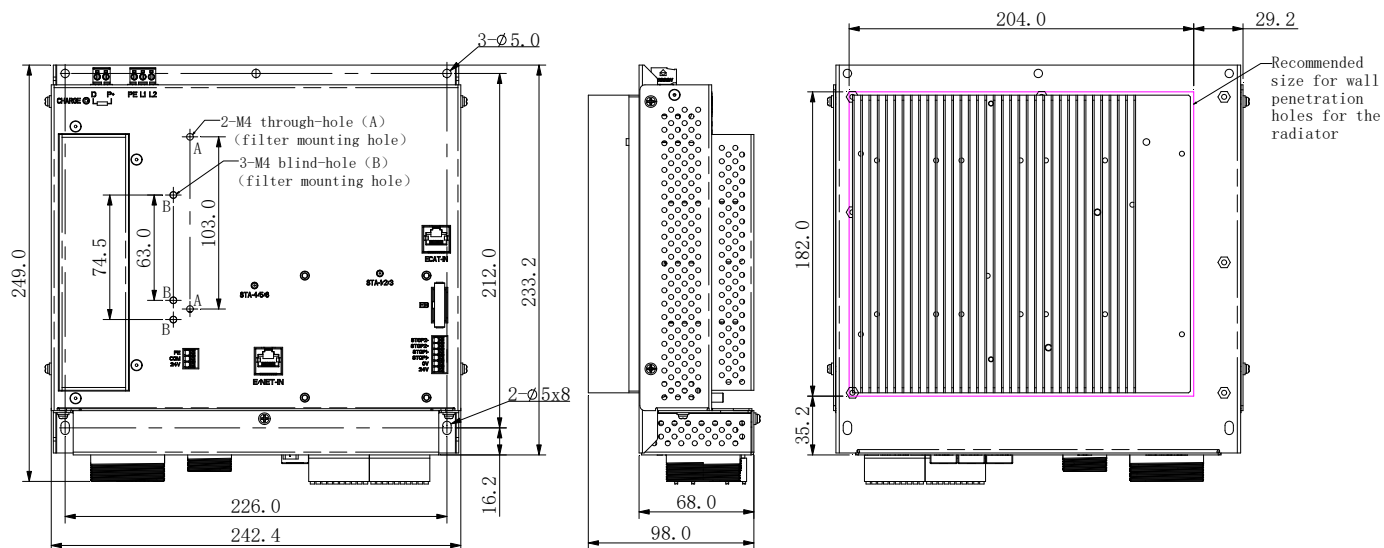
4.1 Drive Outline Dimensions Diagram

R910-S4*05/ S4*08 /S6*05 /S6*08



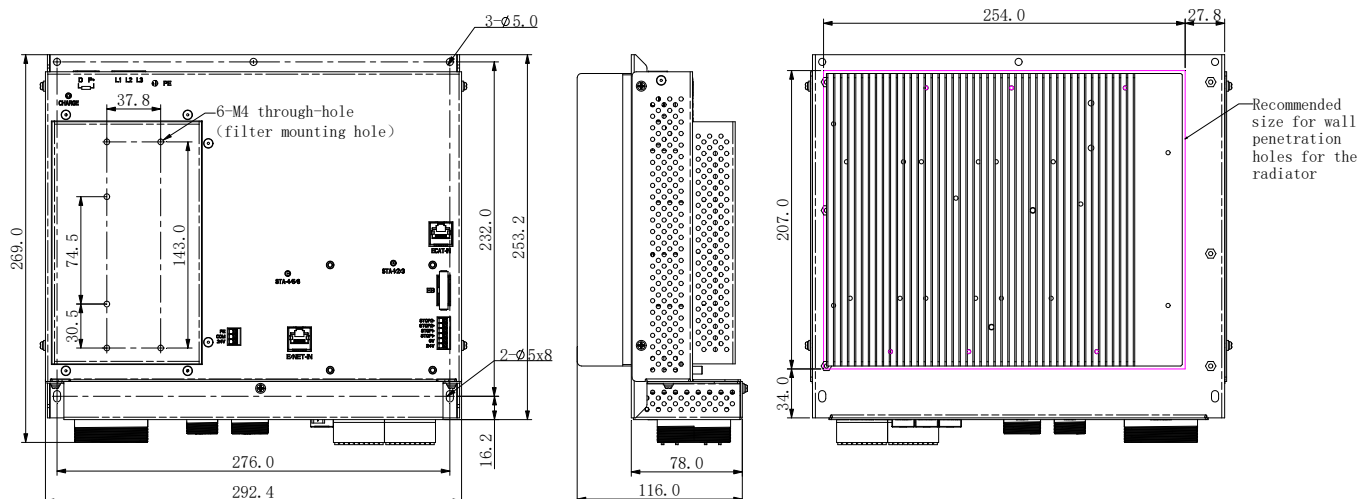
Note: There are 5 M4 filter fixing holes reserved on the top of the drive unit, with a maximum depth of 8 mm. To prevent damage to the machine interior, please select screws of the appropriate length!

R910-S6*10

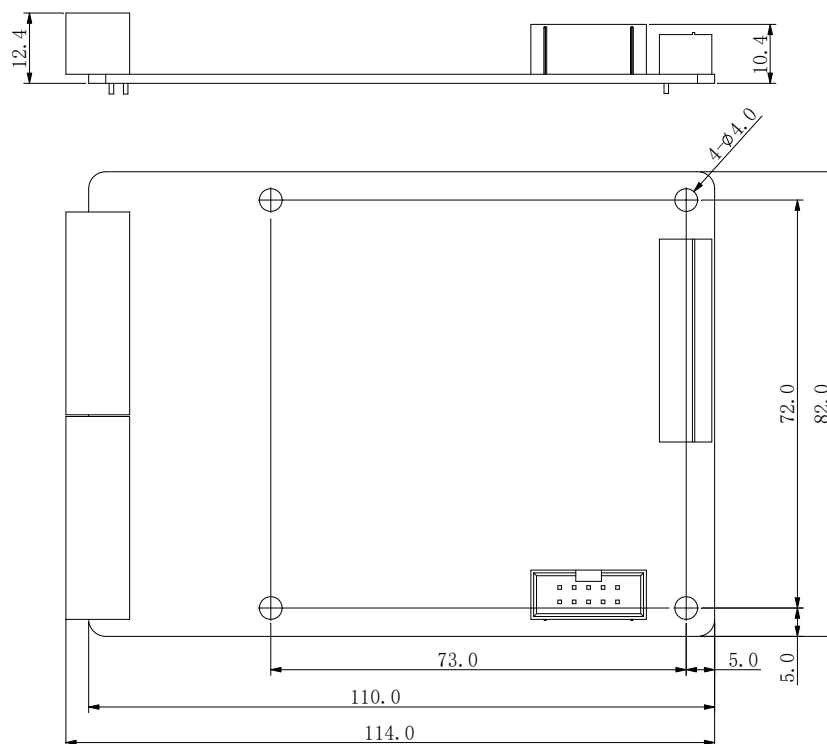


Note: There are 5 M4 filter fixing holes reserved on the top of the drive unit, with a maximum depth of 8 mm. To prevent damage to the machine interior, please select screws of the appropriate length!

R910-S6*15



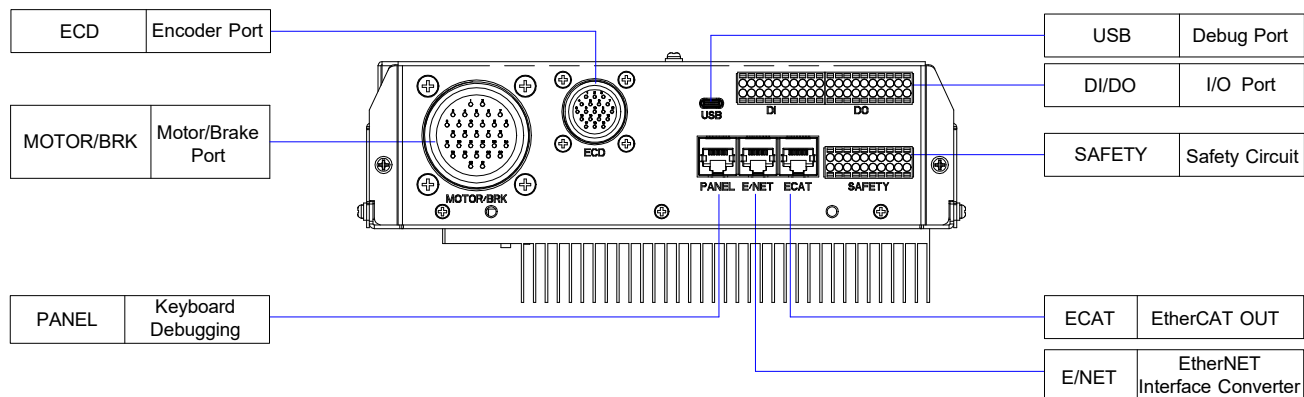
4.2 Expansion I/O Board Dimensions Diagram (R910-PIO01)



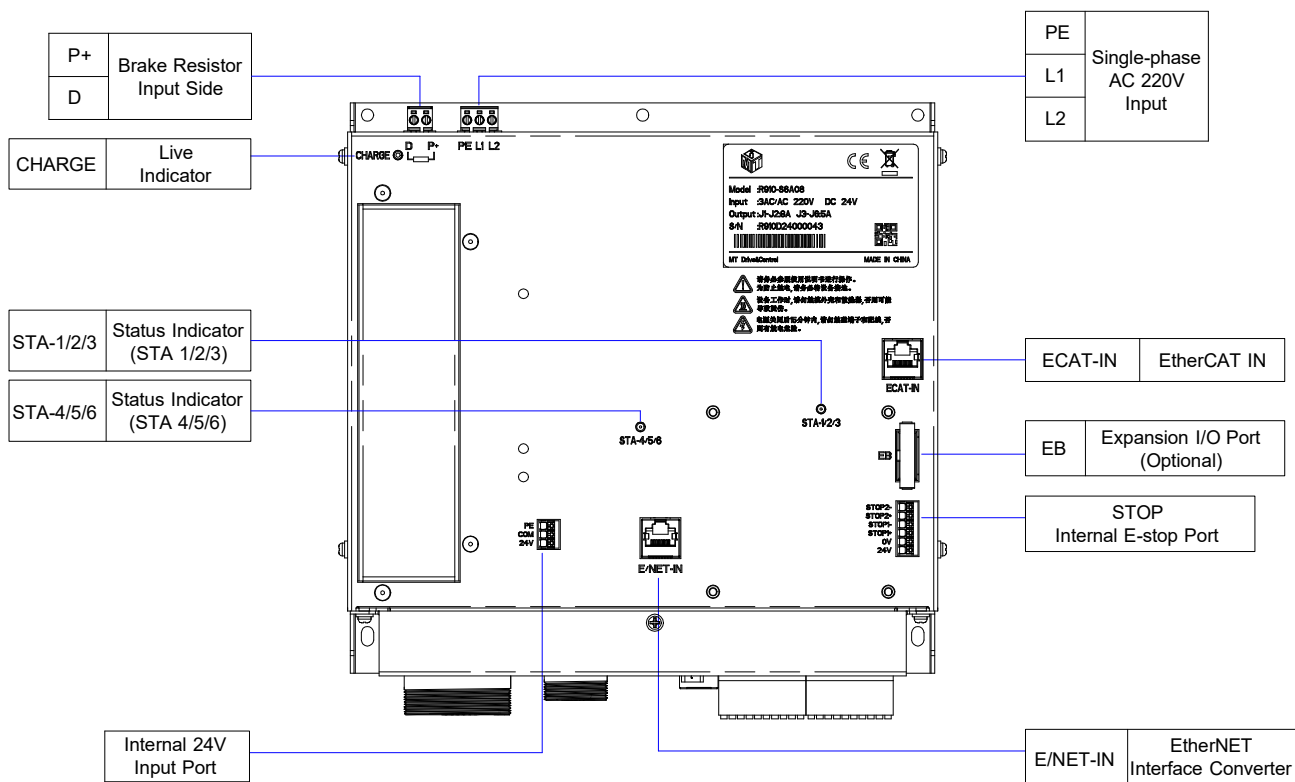
5. Wiring Instructions

5.1 Terminal Definition

R910-S6*05/ S6*08/S6*10/S5*05/S4*05/S4*08

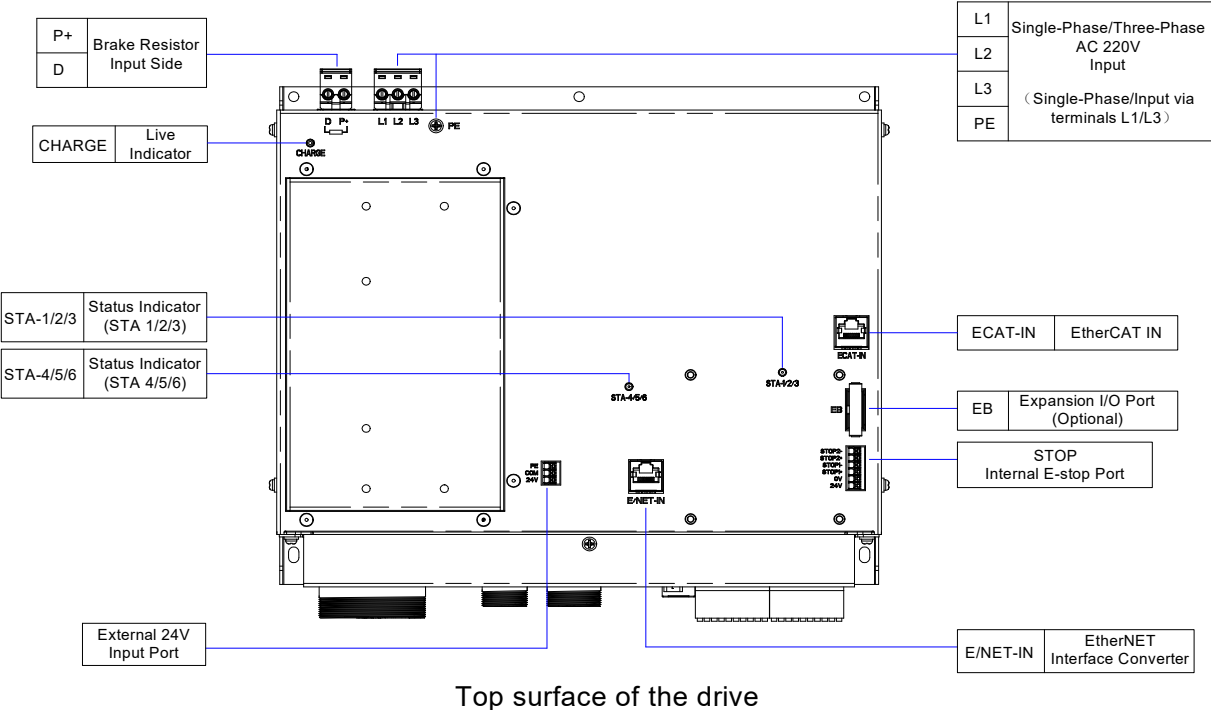
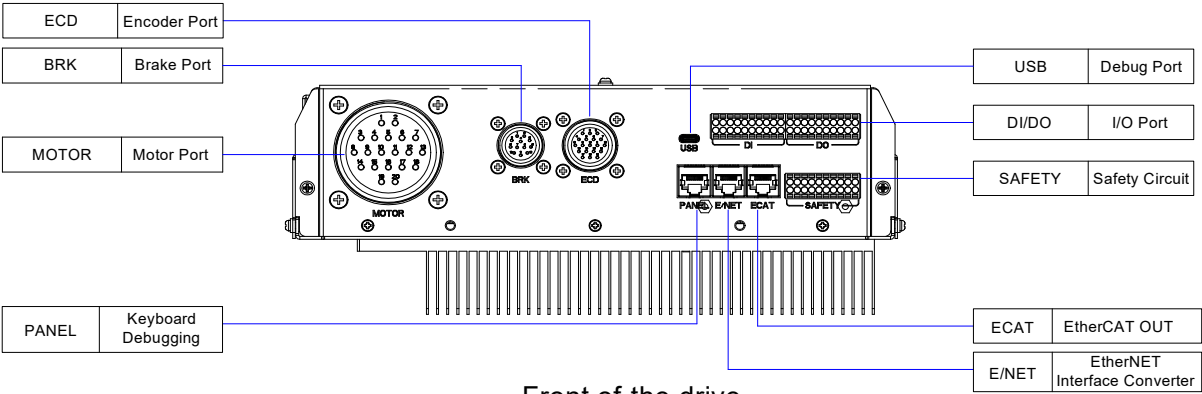


Front of the drive



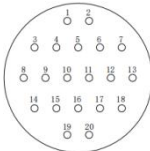
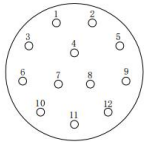
Top surface of the drive

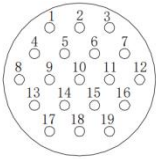
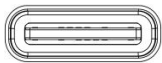
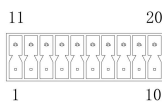
R910-S6*15

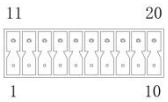
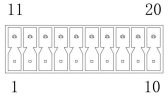
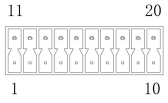


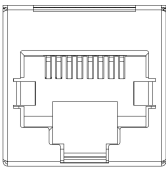
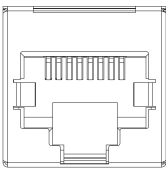
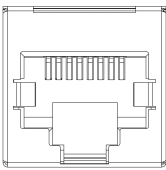
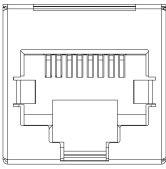
5.2 Drive Front Terminal Wiring Instructions

Terminal name	Function Description	Terminal View	Signal name	Pin number	Function description
MOTOR/BRK	Motor/brake interface (10A and below)		PE1	1	Grounding
			V5	2	Axis 5 V phase
			PE2	3	Grounding
			PE3	4	Grounding
			PE4	5	Grounding
MOTOR/BRK	Motor/brake interface (10A and below)		U5	6	Axis 5 U phase
			W4	7	Axis 4 W phase
			PE5	8	Grounding
			PE6	9	Grounding
			24V	10	Brake 24V
			B1	11	Axis 1 Brake
			U6	12	Axis 6 U phase

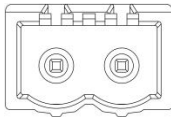
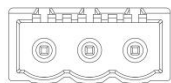
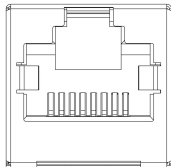
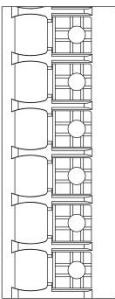
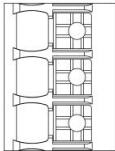
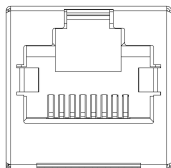
			V4	13	Axis 4 V phase
			W1	14	Axis 1 W phase
			B2	15	Axis 2 Brake
			B3	16	Axis 3 Brake
			B4	17	Axis 4 Brake
			U4	18	Axis 4 U phase
			V1	19	Axis 1 V phase
			W5	20	Axis 5 W phase
			B5	21	Axis 5 Brake
			B6	22	Axis 6 Brake
			V6	23	Axis 6 V phase
			U3	24	Axis 3 U phase
			U1	25	Axis 1 U phase
			W2	26	Axis 2 W phase
			W6	27	Axis 6 W phase
			W3	28	Axis 3 W phase
			V3	29	Axis 3 V phase
			V2	30	Axis 2 V phase
			U2	31	Axis 2 U phase
MOTOR	Motor connector (15A)		PE	1	Grounding
			U3	2	Axis 3 U phase
			PE	3	Grounding
			U6	4	Axis 6 U phase
			W6	5	Axis 6 W phase
			V6	6	Axis 6 V phase
			V3	7	Axis 3 V phase
			U5	8	Axis 5 U phase
			V5	9	Axis 5 V phase
			U2	10	Axis 2 U phase
			V2	11	Axis 2 V phase
			U4	12	Axis 4 U phase
			W3	13	Axis 3 W phase
			W4	14	Axis 4 W phase
			W5	15	Axis 5 W phase
			V4	16	Axis 4 V phase
			W1	17	Axis 1 W phase
			V1	18	Axis 1 V phase
			W2	19	Axis 2 W phase
			U1	20	Axis 1 U phase
BRK	Motor connector (15A)		24V	1	Brake 24V
			24V	2	Brake 24V
			24V	3	Brake 24V
			24V	4	Brake 24V
			B4	5	Axis 4 Brake
			B3	6	Axis 3 Brake
			24V	7	Brake 24V
			24V	8	Brake 24V

			B2	9	Axis 2 Brake
			B6	10	Axis 6 Brake
			B5	11	Axis 5 Brake
			B1	12	Axis 1 Brake
ECD	Encoder interface		ECD2+	1	Axis 2 encoder data +
			ECD5-	2	Axis 5 encoder data -
			ECD6-	3	Axis 6 encoder data -
			ECD2-	4	Axis 2 encoder data -
			ECD5+	5	Axis 5 encoder data +
			ECD6+	6	Axis 6 encoder data +
			ECD1+	7	Axis 1 encoder data +
			ECD4-	8	Axis 4 encoder data -
			5V	9	5V
			5V	10	5V
			5V	11	5V
			ECD1-	12	Axis 1 encoder data -
			ECD4+	13	Axis 4 encoder data +
			GND	14	GND
			GND	15	GND
			GND	16	GND
			ECD3+	17	Axis 3 encoder data +
			ECD3-	18	Axis 3 encoder data -
			NULL	19	Empty
			/	External terminal connector	Shielding layer
USB	Commissioning port		Commissioning port	/	USB debugging port
DI/DO	DI interface		DI0	1	Digital input 0
			DI1	2	Digital input 1
			DI2	3	Digital input 2
			DI3	4	Digital input 3
			DI4	5	Digital input 4
			DI5	6	Digital input 5
			DI6	7	Digital input 6
			DI7	8	Digital input 7
			SS0	9	The common terminal of DI0-DI7
			IO_24V	10	I/O power supply 24V
			DI8	11	Digital input 8
			DI9	12	Digital input 9
			DIA	13	Digital input A
			DIB	14	Digital input B
			DIC	15	Digital input C
			DID	16	Digital input D
			DIE	17	Digital input E
			DIF	18	Digital input F

			SS0	19	The common terminal of DI0-DIF
			IO_0V	20	I/O power supply 0V
	DO interface		DO0	1	Digital output 0
			DO1	2	Digital output 1
			DO2	3	Digital output 2
			DO3	4	Digital output 3
			DO4	5	Digital output 4
			DO5	6	Digital output 5
			DO6	7	Digital output 6
			DO7	8	Digital output 7
			IO_24V	9	I/O power supply 24V
			E-IO_24V	10	External I/O power supply 24V
			DO8	11	Digital output 8
			DO9	12	Digital output 9
			DOA	13	Digital output A
			DOB	14	Digital output B
			DOC	15	Digital output C
			DOD	16	Digital output D
			DOE	17	Digital output E
			DOF	18	Digital output F
			IO_0V	19	I/O power supply 0V
			IO_0V	20	I/O power supply 0V
SAFETY	Safety door		E-STOP_24V	1	Safety interface 24V
			Internal emergency stop 1+	2	Teaching device emergency stop interface
			Internal emergency stop 2+	3	Teaching device emergency stop interface
			External emergency stop 1+	4	External emergency stop interface
			External emergency stop 2+	5	External emergency stop interface
			E-STOP_0V	6	Safety interface 0V
			Safety door 1+	7	Safety door interface
			Safety door 1-	8	
			Safety door 2+	9	
			Safety door 2-	10	
			E-STOP_24V	11	Safety interface 24V
			Internal emergency stop 1-	12	Teaching device emergency stop interface
			Internal emergency stop 2-	13	Teaching device emergency stop interface
			External emergency stop1-	14	External emergency stop interface
			External emergency stop2-	15	External emergency stop interface
			E-STOP_0V	16	Safety interface 0V
SAFETY	安全门				

			Confirm startup 1+	17	Confirm the startup interface
			Confirm startup 1-	18	
			Confirm startup 2+	19	
			Confirm startup 2-	20	
ECAT	EtherCAT Output port Standard Ethernet definition		RJ45 standard Define network interface	1,2	Please use Category 5e or higher specifications Twisted-pair shielded network cable
				3,4	
				5,6	
				7,8	
				Shell	
E/NET	Ethernet Input port Standard Ethernet definition		RJ45 standard Define network interface	1,2	Please use Category 5e or higher specifications Twisted-pair shielded network cable
				3,4	
				5,6	
				7,8	
				Shell	
PANEL	Operation panel		Internal commissioning interface	1,2	Keypad commissioning interface
				3,4	
				5,6	
				7,8	
				Shell	

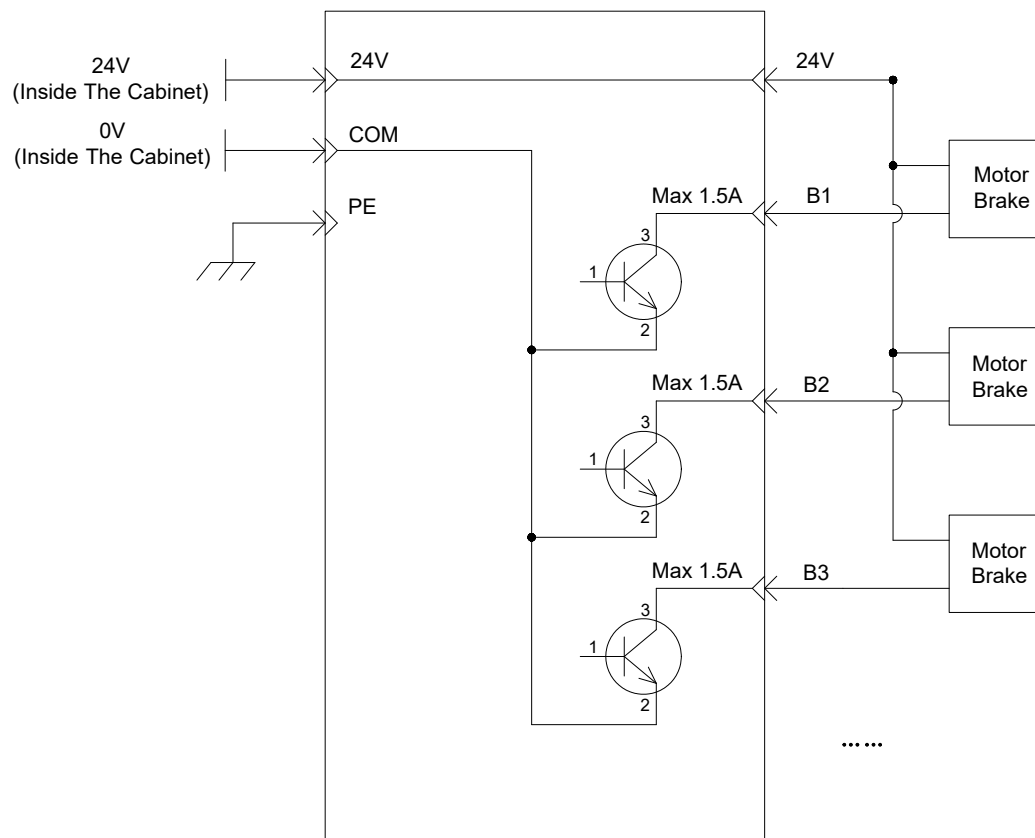
5.3 Drive Top-Surface Terminal Wiring Instructions

Terminal name	Function Description	Terminal View	Signal name	Pin number	Function description
CHARGE	Electrical charge indication		/	/	
P+	Brake resistor connection terminal		/	/	Brake resistor connection terminal; Recommended resistance (15~30Ω); Recommended power (1/5 of total motor power); Note: Resistance <15Ω will damage the braking circuit
D			/	/	
PE	Single-phase AC 220V input terminal		/	/	Grounding
L1			/	/	Single-phase AC220V 50/60Hz
L2			/	/	
ECAT-IN	EtherCAT input port standard Ethernet definition		RJ45 standard definition network interface	1,2	Controller ECAT connection interface; Use Category 5e or higher-grade shielded twisted-pair cable
				3,4	
				5,6	
				7,8	
				Shell	
EB	Expand the I/O interface		/	/	Expanded I/O interface
Internal emergency stop interface of STOP	Internal emergency stop interface of STOP		STOP2-	/	Internal emergency stop input interface
			STOP2+	/	
			STOP1-	/	
			STOP1+	/	
			COM	/	IO input 24V-
			24V	/	IO input 24V+
External 24V input port	Voltage input		PE	/	Grounding
			COM	/	Brake release input 24V-
			24V	/	Brake release input 24V+
E/NET-IN	Ethernet input port		RJ45 standard definition network interface	1,2	Controller NET connection interface; Use Category 5e or higher-grade shielded twisted-pair cable
				3,4	
				5,6	
				7,8	
				Shell	
WARNING	Do NOT connect the input power cable to the brake resistor terminals (P+, D), as this will cause permanent damage to the drive!				

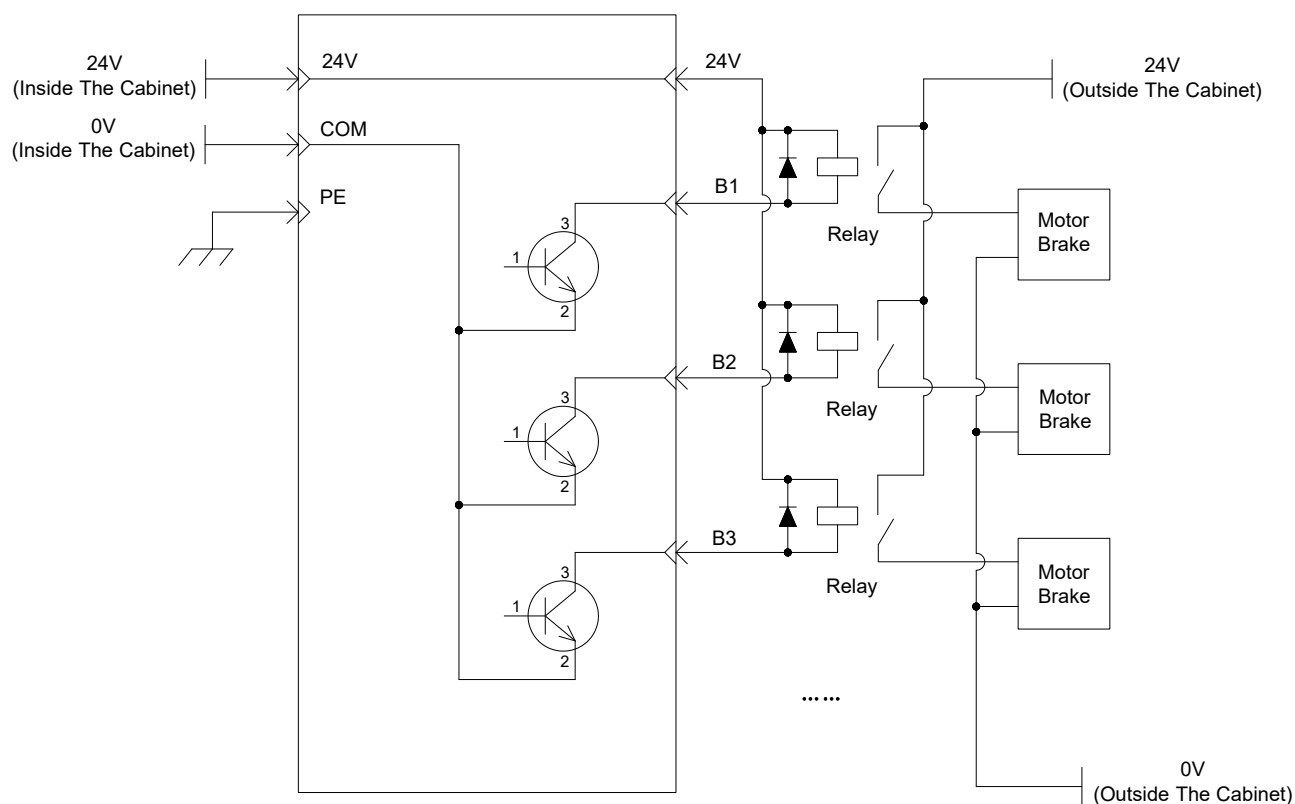
5.4 Control Circuit Wiring Instructions

5.4.1 Brake Terminal Wiring (brake power supply connected to 24V, COM, and PE)

- When the brake control output current is $\leq 1.5\text{ A}$, directly use B1, B2, B3... to output control for the motor brake:

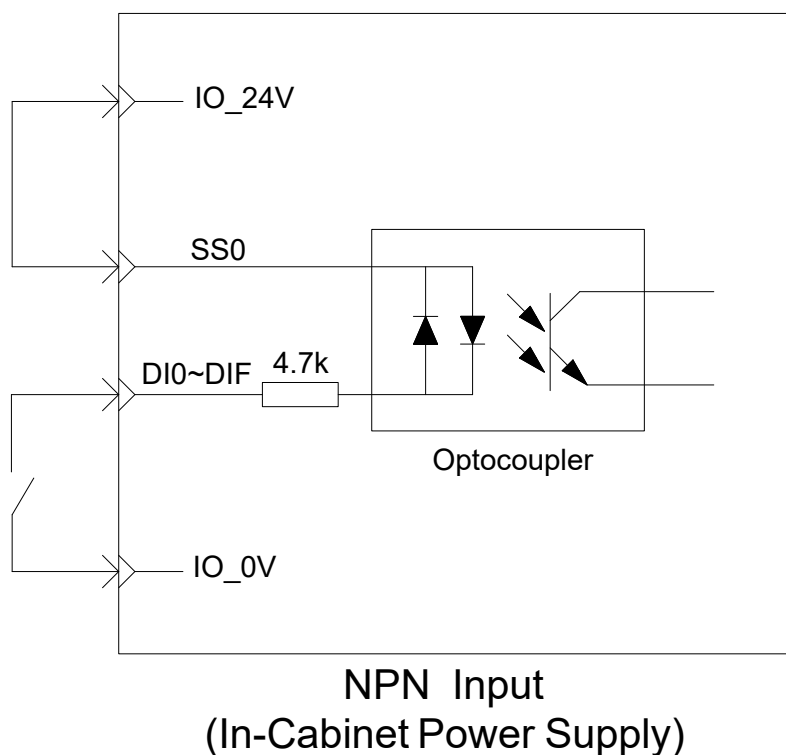


- When the output current of the brake control exceeds 1.5 A, the motor brake is controlled by the relay:

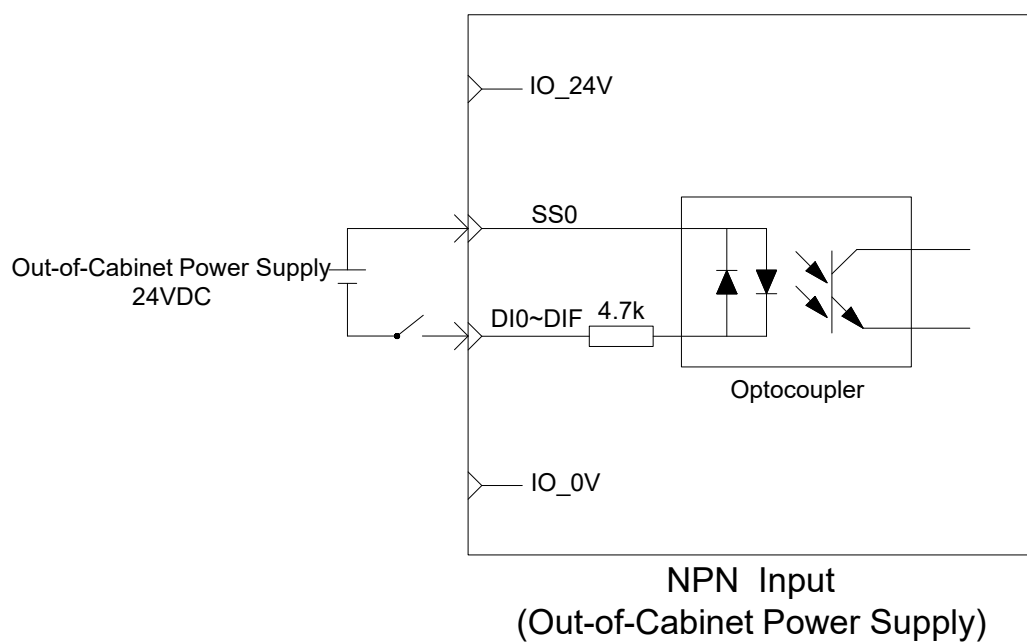


5.4.2 DI Terminal Wiring

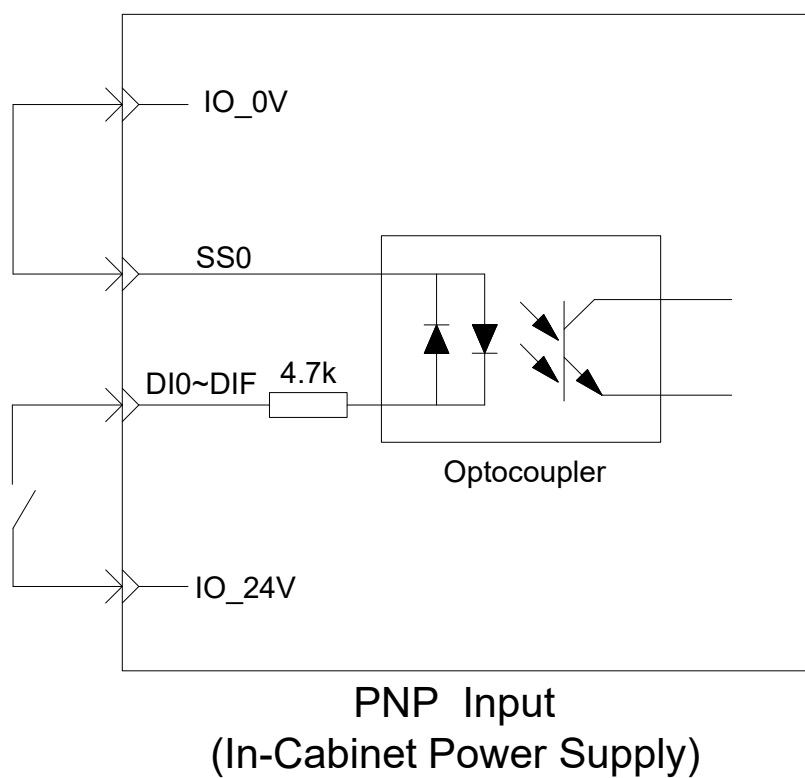
➤ NPN Input (Internal Power Supply) Connection Method



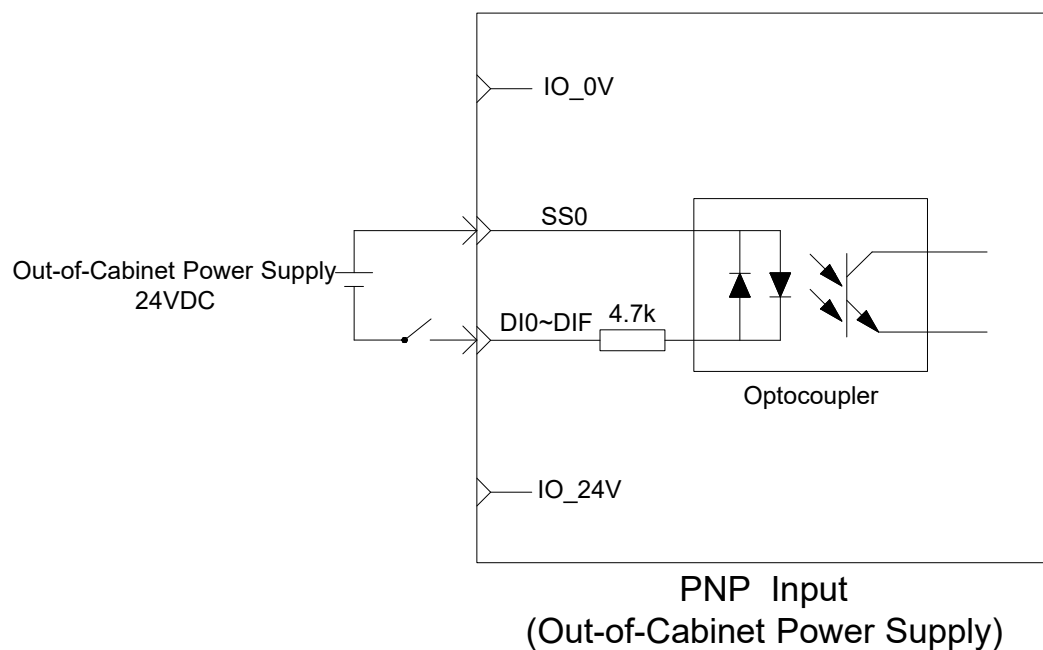
➤ NPN Input (External Power Supply) Connection Method



➤ PNP Input (Internal Power Supply) Connection Method

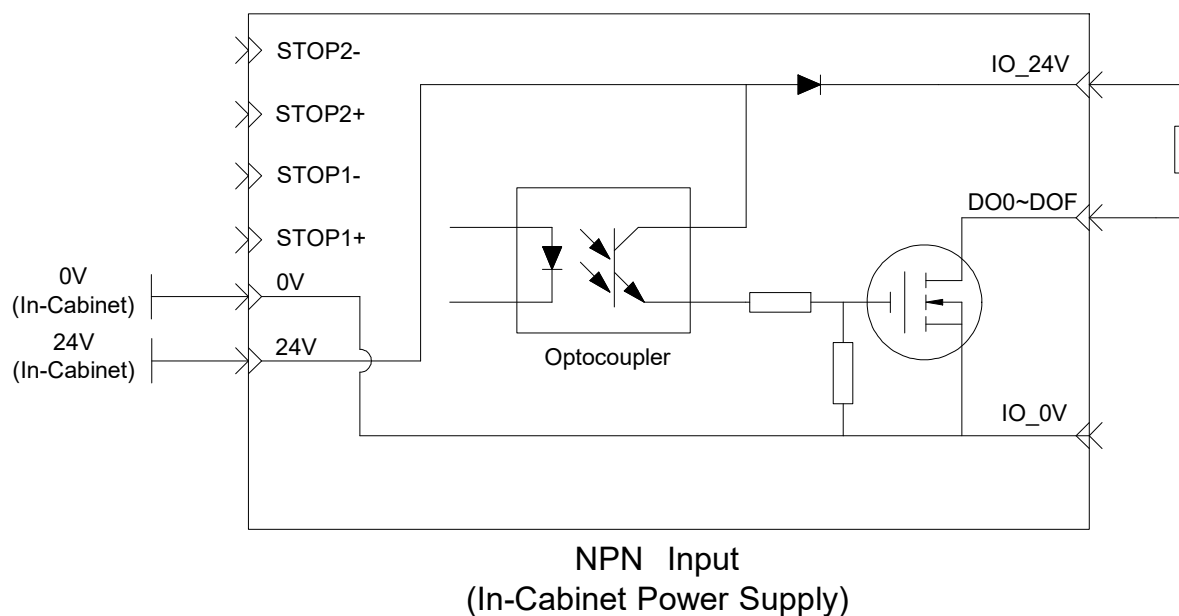


➤ PNP Input (External Power Supply) Connection Method

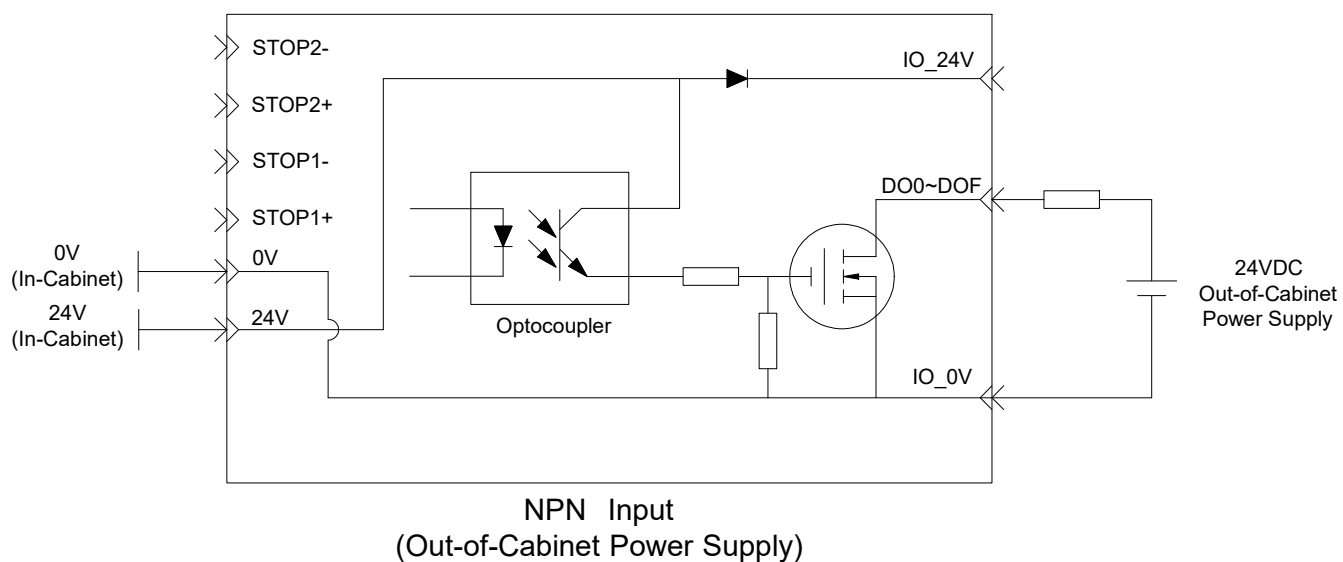


5.4.3 DO Terminal Wiring

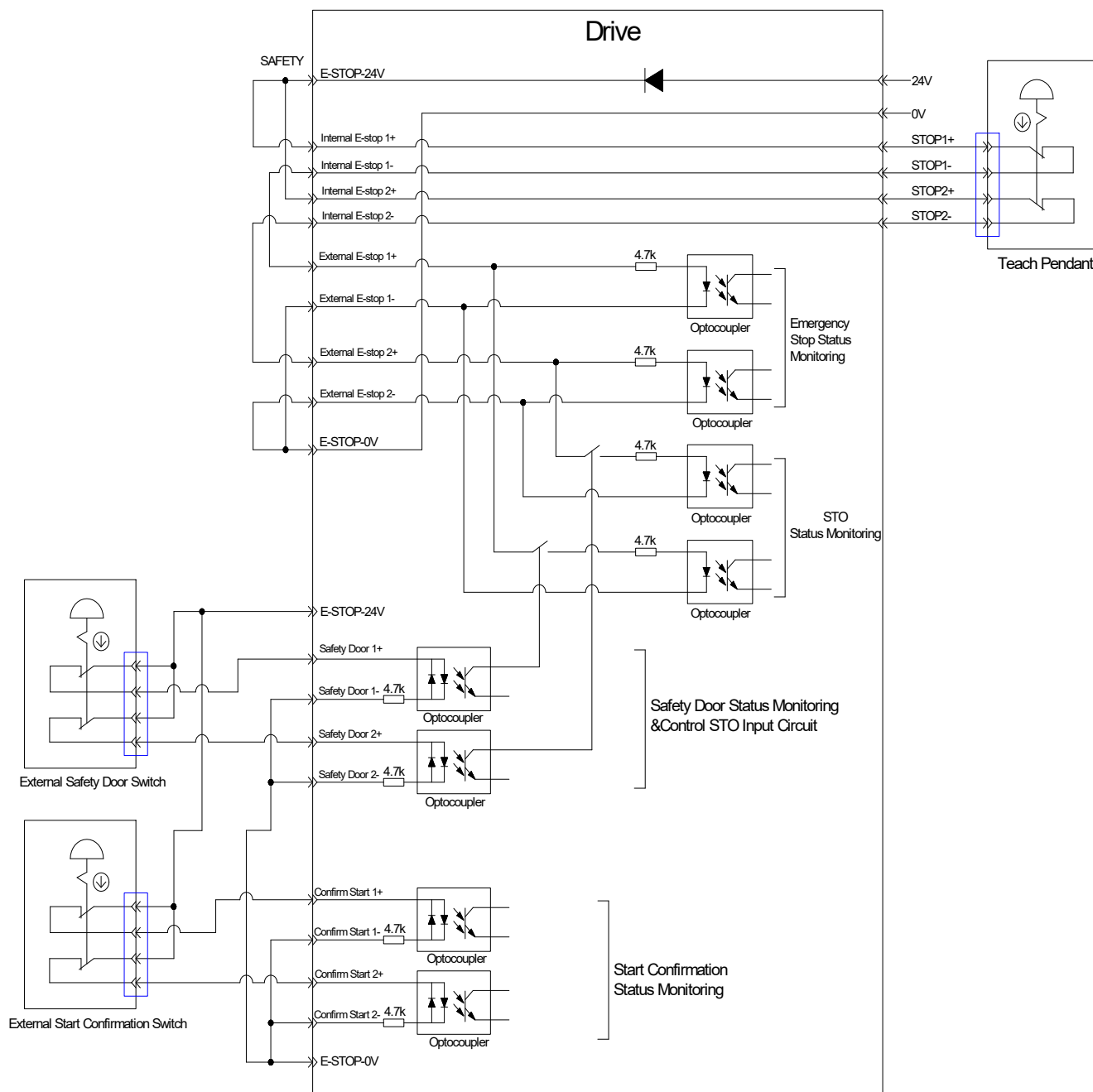
- NPN output (internal power supply) connection method



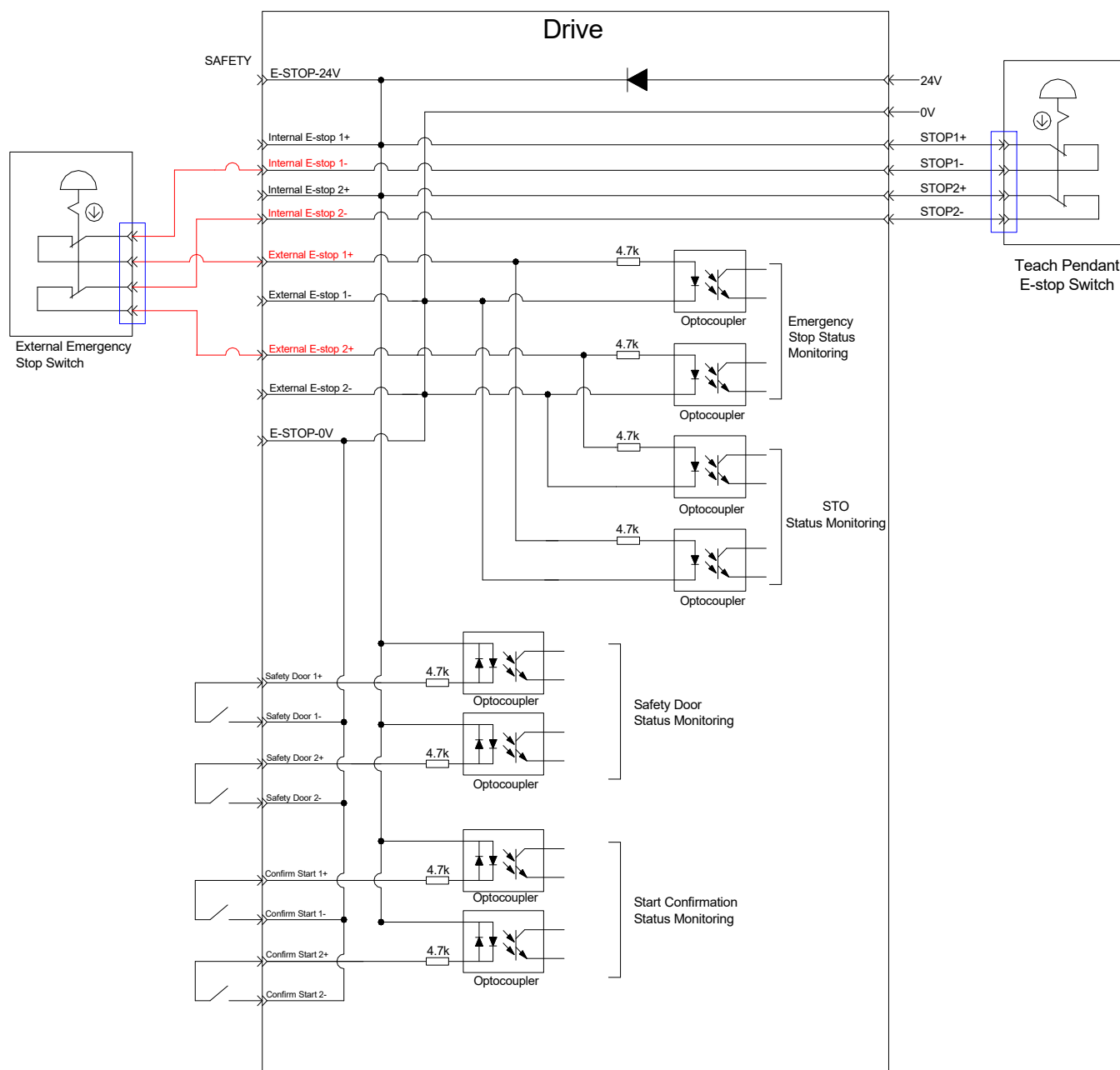
NPN output (external power supply) connection method



5.4.4 Internal Emergency Stop, External Emergency Stop, Safety Door, and Start Confirmation



External Emergency Stop Present

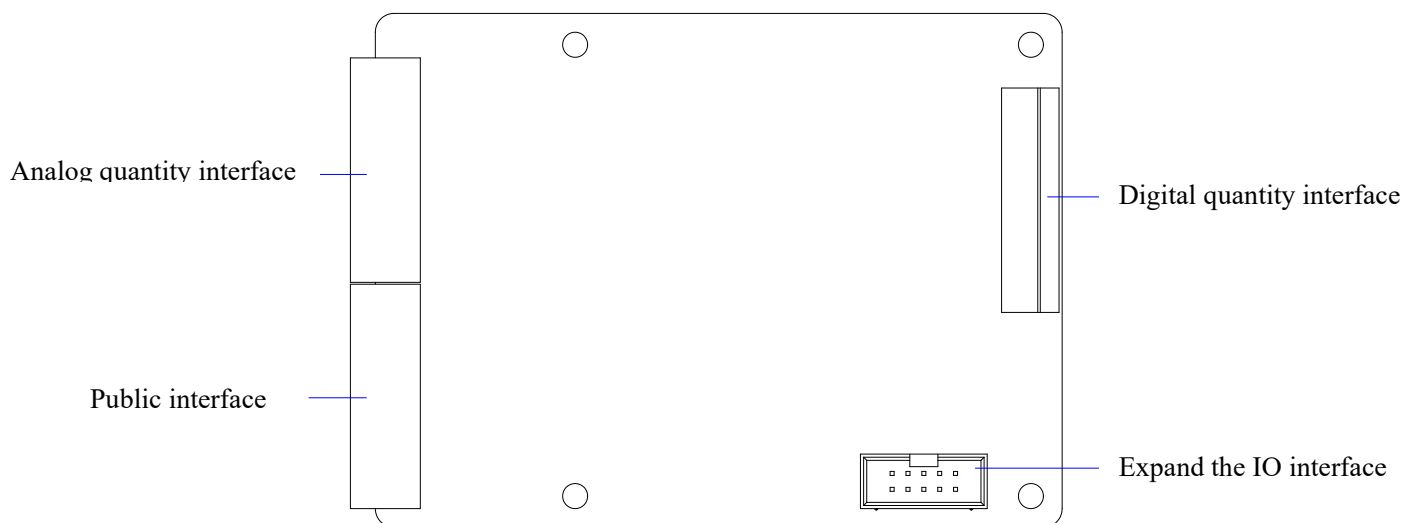


Description:

- 1.Special Signal Cable(white), Pre-wired by supplier prior to shipment;
- 2.Special Signal Cable(red), To be connected by customer.

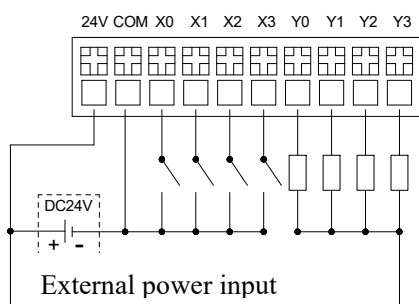
Note: The ones with the EB expansion I/O interface on the top right are the new versions.

5.5 Expansion I/O Board Terminal Definition (R910-PIO01)

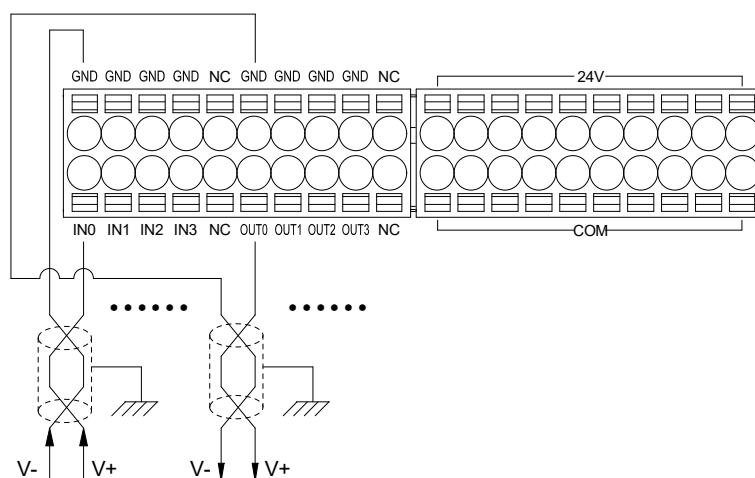


5.6 Expansion I/O Board Wiring Instructions (R910-PIO01)

Digital quantity interface



Analog quantity interface



Public interface

5.7 Expansion I/O Board Specifications (R910-PIO01)

Basic Information	
Current Consumption	200mA @5V
Wiring	IO wiring :0.3mm ² (22AWG) ~ 1mm ² (17AWG)
	Recommended wire gauge: 0.3~1mm ² ; Crimp ferrule length: 10mm
Operating Temperature	-20~50℃
Storage Temperature	-25~65℃
Relative Humidity	5%~95% non-condensing

Digital Input Characteristics	
Number of Channels	4 (X0-X3)
Type	NPN type
Indicators	4-channel indicators
ON Voltage	12~30V
OFF Voltage	0~5V
ON Current	Max 5mA
Input Delay	ON to OFF: 1.5ms OFF to ON : 1.5ms
Equivalent Bandwidth	Max 300Hz
Digital Output Characteristics	
Number of Channels	4 (Y0-Y3)
Type	NPN type
Indicators	4-channel indicators
Load Capacity	1.5 A per channel, total Max 4A for 4 channels
Leakage Current	Max 10uA
Output Delay	ON to OFF: 150us OFF to ON : 150us
Equivalent Bandwidth	Max 3kHz
Protection Features	Short-circuit protection
Analog Input	
Number of Channels	4
Type	Voltage input
Indicators	4-channel indicators
Input Range	-10~10V (default) 、 0~10V、 -5~5V、 0~5V、 1~5V
Resolution	16bit
Accuracy	±0.1%@25℃
Analog-to-Digital Corresponding Values	-10~10V:-32768~32767 (default) 0~10V:0~27648 -5~5V:-32768~32767 -10~10V:-32000~32000 0~10V:0~32000 -5~5V:-27648~27648 -5~5V:-32000~32000 0~5V:0~32767 0~5V:0~27648 0~5V:0~32000 1~5V:0~32767
Output Characteristics	
Number of Channels	4
Type	Voltage output
Indicators	4-channel indicators
Output Range	-10~10V (default) 、 0~10V、 -5~5V、 0~5V、 1~5V
Resolution	16bit
Accuracy	±0.1%@25℃
Analog-to-Digital	-32768~32767:-10~10V (default)

Corresponding Values	0~27648:0~10V -32768~32767:-5~5V -32000~32000:-10~10V 0~32000:0~10V -27648~27648:-5~5V -32000~32000:-5~5V 0~32767:0~5V 0~27648:0~5V 0~32000:0~5V 0~32767:1~5V
Hardware Filtering	0.25 ms
Conversion Time	250us/4 channels
Load Capacity	>2kΩ
Short-Circuit Protection	Supports load short-circuit protection (Do NOT short-circuit for extended periods)
Safety Functions	Fault hold output / Output fault value (channel-independent)
Common Terminal Interface	
COM Terminal	Max current per pin: 8 A
24V Terminal	Max current per pin: 8 A

6. Function Codes

6.1 Function Code List

6.1.1 Parameter and Attribute Definitions

Functional group	Functional description	Quantity	Width
P0	Basic Parameter Group	100	16bit
P1	Advanced Commissioning Parameters	100	
P2	Motor Parameter Group	100	
P3	Function Parameter Group	100	
d0	Monitoring Parameter Group	100	
ErrCode	Alarm Codes and Descriptions	100	

Function code identification description			
R	Read only parameters, users cannot modify them	•	Parameter modification must be powered on again to be effective
B	IO status display	K	Restore to factory and maintain original value

H	Hexadecimal parameters, modified bit by bit	☆	Related to the drive 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 status	S	speed control
▲	Do not save parameter values after power failure	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	Set the range	Unit	Factory default	Attribute	Associated pattern
P0-00	20000	0X2000:01	Software version	Software version	0~65535		1000	R	
P0-01	20001	0X2000:02	Drive model	4:S5R0(5A) 220V 5:S8R0(8A) 220V 6:S015(15A) 220V 7:T6R0(6A) 380V 8:T8R5(8.5A) 380V 9:T12R(12A) 380V 10:T20R(20A) 380V 11:T25R(25A) 380V 12:T35R(35A) 380V	4~12		4	■	
P0-02	20002	0X2000:03	Motor code	Motor ID:1000~3500	1000~3500		1400	■	
P0-03	20003	0X2000:04	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	0x0000 ~ 0x1111		0x0000	H/■	P.S.T
P0-04	20004	0X2000:05	Manufacturer's functional parameters	0: Prohibit modifying P0-06/07 parameters 1: Allow modification of P0-06/07 parameters	0~1		0		
P0-05	20005	0X2000:06	Maximum speed threshold	0~6000	0~6000	rpm	4500		
P0-06	20006	0X2000:07	Forward maximum torque limit	0~300	0~300	%	300		
P0-07	20007	0X2000:08	Reverse maximum torque limit	0~300	0~300	%	300		
P0-08	20008	0X2000:09	Motor direction logic	0: CCW direction is the positive rotation direction 1: CW direction is the positive rotation direction	0~1		0	■	
P0-09	20009	0X2000:10	Encoder type setting	Units:Encoder type 0:Incremental type, 1:Multi-turn absolute value type 2:Single-turn absolute value type 3:Infinite rotation mode Tens: 0: Enable Overspeed Alarm 1:Disable Overspeed Alarm Hundreds: 0:Ethercat speed unit selected in rpm 1:Ethercat speed unit selected in pp/s	0x0000 ~ 0x2113		0x1100		

R910 series servo drive for robots Simplified User Manual

P0 group		Basic Parameter Group							
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
				Thousandths:Motor code recognition 0:Turn off the automatic recognition of motor codes 1:Enable automatic recognition of motor codes 2:Write the motor code into the motor					
P0-10	20010	0X2000:11	Control method	0:TRQ 1:SPD 2:POS 3:EtherCAT	0~13		0		PS
P0-11	20011	0X2000:12	Brake ON delay time	Delay Time from Servo-On Command to Brake Engagement	100~500	ms	100	■	P.S.T
P0-12	20012	0X2000:13	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	0X2000:14	Reserved						
P0-14	20014	0X2000:15	Reserved						
P0-15	20015	0X2000:16	Overload protection coefficient of motor	10~100	10~100	%	50		
P0-16	20016	0X2000:17	USB monitoring settings	Units:USB low-speed monitoring sampling interval, unit ms (0-5) 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 Thousandths:Reserved	0x0000 ~ 0x0035		0x0000	H/■	P.S.T
P0-17	20017	0X2000:18	The keypad enables control of characters	0:Servo OFF 1:Servo ON	0~1		0	■	
P0-18	20018	0X2000:19	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	0x0000 ~ 0x0011		0	■	

P0 group	Basic Parameter Group								
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
				alarm					
P0-19	20019	0X2000:20	Reserved						
P0-20	20020	0X2000:21	Load inertia ratio	The ratio of load inertia to motor inertia	0~3000	%	100		S
P0-21	20021	0X2000:22	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	0X2000:23	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	0X2000:24	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	0X2000:25	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	0X2000:26	The integral time constant of the second velocity loop	The smaller the value, the stronger the integration effect, and the stronger the speed tracking ability, which needs to be coordinated with the speed loop gain and position loop gain	20~1000.0	0.1 Hz	125		S
P0-26	20026	0X2000:27	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	0X2000:28	Speed feedforward selection	Units:Speed feedforward selection 0:Internal speed feedforward(P0-28) 1:External given	0x0000 ~ 0x1111		0x0000	■	P

R910 series servo drive for robots Simplified User Manual

P0 group		Basic Parameter Group							
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
				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	0X2000:29	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	0X2000:30	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	0X2000:31	Reserved	Reserved	50~1000		100		P
P0-31	20031	0X2000:32	DI1 function	Units&tens: 00~05: Reserved 08: Emergency stop 09: Axis 1 origin switch 0A: Axis 2 origin switch 0B: Axis 3 origin switch 0C: Axis 1 positive limit 0D: Axis 2 positive limit 0E: Axis 3 positive limit 0F: Axis 1 negative limit 10: Axis 2 negative limit 11: Axis 3 negative limit 12: Axis 1 probe 1 13: Axis 2 probe 1 14: Axis 3 probe 1 15: Axis 1 probe 2 16: Axis 2 probe 2 17: Axis 3 probe 2 Hundreds: 0: Positive logic 1: Negative logic	0x0000 ~ 0x0117		000C		
P0-32	20032	0X2000:33	DI2 function	Same as P0-31	0x0000 ~ 0x0117		000F		

R910 series servo drive for robots Simplified User Manual

P0 group	Basic Parameter Group								
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
P0-33	20033	0X2000:34	DI3 function	Same as P0-31	0x0000 ~ 0x0117		0009		
P0-34	20034	0X2000:35	DI4 function	Same as P0-31	0x0000 ~ 0x0117		0012		
P0-35	20035	0X2000:36	DI5 function	Same as P0-31	0x0000 ~ 0x0117		0015		
P0-36	20036	0X2000:37	Reserved	Reserved					
P0-37	20037	0X2000:38	DI filtering time(DI1~DI6)	0~32ms	0~32		0		
P0-38	20038	0X2000:39	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	0X2000:40	Number of position command pulses corresponding to one rotation of the motor (high position)	0~20000	0~20000		838	■	P
P0-40	20040	0X2000:41	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	0X2000:42	Moving average filter constant	--	0~200.0	ms	0		P
P0-42	20042	0X2000:43	First order low-pass filter constant	--	0~6000.0	ms	0		P
P0-43	20043	0X2000:44	Reserved	--	0~65535		0	L	P
P0-44	20044	0X2000:45	Reserved	--	0~16384		2		
P0-45	20045	0X2000:46	Reserved	--	0~65535		10000	L	P
P0-46	20046	0X2000:47	Reserved	--	0~16384		0		
P0-47	20047	0X2000:48	Reserved	--	4~16384		2500	■	P
P0-48	20048	0X2000:49	Reserved	--	0x0000 ~ 0x0001		0x0000	H/■	P
P0-49	20049	0X2000:50	Position deviation limit	0.1~50.0 turns	0.1~50.0		10.0	■	
P0-50	20050	0X2000:51	EtherCAT synchronization cycle	1~256 (x0.125ms)=[0.125ms~32ms]	1~256	0.125/ms	8		
P0-51	20051	0X2000:52	Quadrant Protuberance CCW Compensation Value	0~1000‰	0~1000		0		
P0-52	20052	0X2000:53	Quadrant Protuberance CW Compensation Value	0~1000‰	0~1000		0		

R910 series servo drive for robots Simplified User Manual

P0 group	Basic Parameter Group								
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
P0-53	20053	0X2000:54	Quadrant Protuberance Compensation Delay Time	0~1000 ms	0~1000		0		
P0-54	20054	0X2000:55	Quadrant Protuberance Compensation Filtering	0~100ms	0~100		0		
P0-55	20055	0X2000:56	Gravity compensation value	0~1000‰	0~1000		0		
P0-56	20056	0X2000:57	Gravity compensation polarity	0: CCW direction compensation 1: CW direction compensation	0~1		0		
P0-57	20057	0X2000:58	Notch filter frequency	10-5000 Hz	10~5000		100		
P0-58	20058	0X2000:59	Notch filter depth	0~20	0~20		10		
P0-59	20059	0X2000:60	Notch filter gain	0~500%	0~500		0		
P0-60	20060	0X2000:61	Zero offset of the magnetic pole	0~2048,<<12	0~2048		253		
P0-61	20061	0X2000:62	Speed command (for debugging)	Speed command reference set by Pn parameter	0~4500	rpm	100		
P0-62~P0-64	20062~20064	0X2000:63~0X2000:65	Reserved						
P0-65	20065	0X2000:66	Ud-Kp	130	0~800		50		
P0-66	20066	0X2000:67	Ud-Ki	25	0~500		25		
P0-67	20067	0X2000:68	Uq-Kp	130	0~300		50		
P0-68	20068	0X2000:69	Uq-Ki	25	0~300		25		
P0-69	20069	0X2000:70	Reserved						
P0-70	20070	0X2000:71	Speed command polarity	0~1	0~1		0		
P0-71	20071	0X2000:72	Servo adaptive rigidity	20~20000(Prevent nodding phenomenon during the enabling process under gravity or load conditions)	20~20000		1200	▲	
P0-72	20072	0X2000:73	The first set of gain speed inflection points	/	0~6000	rpm	6000		
P0-73	20073	0X2000:74	The second set of gain speed inflection points	/	0~6000	rpm	6000		
P0-74~P0-79	20074~20079	0X2000:75~0X2000:80	Reserved						
P0-80	20080	0X2000:81	One-click aging parameters		0~6		0		
P0-81	20081	0X2000:82	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 Thousandths:	0x0000~0x111		0x0000	H	P.S.T

R910 series servo drive for robots Simplified User Manual

P0 group		Basic Parameter Group							
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
				Reserved 0:Normal mode					
P0-82	20082	0X2000:83	Manufacturer calibration mode	Units:Manufacturer's current calibration mode0:Close 1:Enable,The motor is only used for internal calibration by the manufacturer others:Reserved	0x0000 ~ 0x0001		0x0000	H	PST
P0-83	20083	0X2000:84	Reserved						
P0-84	20084	0X2000:85	VDC calibration	27800~37683	27800~37683		27800	K	P.S.T
P0-85	20085	0X2000:86	High position of Serial number (first test year)	2015~2029	2015~2029		2017	K	P.S.T
P0-86	20086	0X2000:87	Median of Serial number (first test month day)	0101~1231	0101~1231		907	K	P.S.T
P0-87	20087	0X2000:88	Low position of Serial number (first test Serial number)	0x0000~0xFFFF	0x0000 ~ 0xFFFF		0x0000	H/K	P.S.T
P0-88	20088	0X2000:89	Single board tooling testing QC label	0xA7E3:Pass Others:NG	0x0000 ~ 0xFFFF		0x0000	H/K	P.S.T
P0-89	20089	0X2000:90	Test the QC label before aging	0x8F68:Pass Others:NG	0x0000 ~ 0xFFFF		0x0000	H/K	P.S.T
P0-90	20090	0X2000:91	12-hour aging test label	0x5A5A:Pass Others:NG	0x0000 ~ 0xFFFF		0x0000	H/K	P.S.T
P0-91	20091	0X2000:92	Test label for the entire machine after aging	0xB80F:Pass Others:NG	0x0000 ~ 0xFFFF		0x0000	H/K	P.S.T
P0-92	20092	0X2000:93	Function password	E5DA:Clear the multi-turn values of the encoder	0x0000 ~ 0xFFFF		0x0000	H/K	P.S.T
P0-93	20093	0X2000:94	Reserved						
P0-94	20094	0X2000:95	Reserved	Reserved					
P0-95	20095	0X2000:96	Reserved	Reserved	0x0000 ~ 0xFFFF		0x0000	H/K	P.S.T
P0-96	20096	0X2000:97	Reserved	Reserved	0x0000 ~ 0xFFFF		0x0000	H/R/K	P.S.T
P0-97	20097	0X2000:98	Reserved	Reserved	0x0000 ~ 0xFFFF		0x0000	H/R/K	P.S.T
P0-98	20098	0X2000:99	Reserved	Reserved	0x0000 ~ 0xFFFF		0x0000	H/R/K	P.S.T
P0-99	20099	0X2000:100	Reserved	Reserved	0x0000 ~ 0xFFFF		0x0000	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	Set the range	Unit	Factory default	Attribute	Associated pattern
P1-00	20100	0X2001:01	Self adjusting mode	0:Manual adjustment 1:Rigidity grade adjustment 2:Position loop bandwidth + inertia self-adjustment (slow change) 3:Position loop bandwidth + inertia self-adjustment (rapid change)	0~3		0		
P1-01	20101	0X2001:02	Rigidity grade	Rigidity grade setting	1~32		12		
P1-02	20102	0X2001:03	Reserved	Reserved	0~65535		0		
P1-03	20103	0X2001:04	Inertia identification mode	0:Internal instruction round-trip motion mode 1:Controller command mode 2:Continuous automatic recognition	0~2		0		
P1-04	20104	0X2001:05	Inertia identification completion mark	0:Inertia identification is not completed 1:The inertia identification has been completed	0~1		0		
P1-05	20105	0X2001:06	Max Speed for Inertia Identification	Inertia identification allows for the maximum operating speed	300~3000	rpm	1000		
P1-06	20106	0X2001:07	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	0X2001:08	Maximum Movement Revolutions for Inertia Identification	Permitted Travel Revolutions for Inertia Identification	1~50	r	5		
P1-08	20108	0X2001:09	Waiting time for completion of single inertia identification	Waiting time for completion of single inertia identification motion	0~30000	ms	100		
P1-09~P1-14	20109~20114	0X2001:10~0X2001:15	Reserved	Reserved	0~65535		0		
P1-15	20115	0X2001:16	Vibration detection threshold	Vibration detection threshold	0~100		100		
P1-16	20116	0X2001:17	Vibration detection time	Vibration detection time	0~100		50		
P1-17	20117	0X2001:18	Frequency of the first notch filter	Notch filter frequency	10~5000		5000		
P1-18	20118	0X2001:19	Width of the first notch filter	Notch filter width	0~100		2		
P1-19	20119	0X2001:20	Depth of the first notch filter	Notch filter depth	0~100		0		
P1-20	20120	0X2001:21	Frequency of the second notch filter	Notch filter frequency	0~65535		5000		

R910 series servo drive for robots Simplified User Manual

P1 group	Advanced Commissioning Parameter Group								
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
P1-21	20121	0X2001:22	Width of the second notch filter	Notch filter width	0~65535		2		
P1-22	20122	0X2001:23	Depth of the second notch filter	Notch filter depth	0~65535		0		
P1-23	20123	0X2001:24	Frequency of the third notch filter	Notch filter frequency	0~65535		5000		
P1-24	20124	0X2001:25	Width of the third notch filter	Notch filter width	0~65535		2		
P1-25	20125	0X2001:26	Depth of the third notch filter	Notch filter depth	0~65535		0		P
P1-26	20126	0X2001:27	Frequency of the fourth notch filter	Notch filter frequency	0~65535		5000		P
P1-27	20127	0X2001:28	Width of the fourth notch filter	Notch filter width	0~65535		2		P
P1-28	20128	0X2001:29	Depth of the fourth notch filter	Notch filter depth	0~65535		0		
P1-29	20129	0X2001:30	Frequency of the fifth notch filter	Notch filter frequency	0~65535		5000		
P1-30	20130	0X2001:31	Width of the fifth notch filter	Notch filter width	0~65535		2		S
P1-31	20131	0X2001:32	Depth of the fifth notch filter	Notch filter depth	0~65535		0		S
P1-32	20132	0X2001:33	End vibration suppression frequency	End positioning vibration suppression frequency	10~2000		2000		S
P1-33	20133	0X2001:34	End vibration suppression frequency compensation	End vibration suppression frequency compensation	0~200		100		S
P1-34	20134	0X2001:35	Maximum allowable weak magnetic current	Maximum allowable weak magnetic current	0~100		50		S
P1-35	20135	0X2001:36	Weak magnetic enablement	0:Disable the weak magnetic function 1:Enable the weak magnetic function	0~1		0		S
P1-36	20136	0X2001:37	Weak magnetic gain	Weak magnetic gain	0~300		100%		S
P1-37	20137	0X2001:38	Weak magnetic point velocity	Activate weak magnetic control speed	0~6000		4000		P
P1-38	20138	0X2001:39	PDFF controls the gain coefficient	PDFF controls the gain coefficient	0~100		100		
P1-39	20139	0X2001:40	Reserved						
P1-40	20140	0X2001:41	Reserved						T
P1-41	20141	0X2001:42	Reserved						T
P1-42	20142	0X2001:43	Disturbance compensation time coefficient	Disturbance compensation time coefficient	0~40000	0.1 Hz	15.0		T
P1-43	20143	0X2001:44	Disturbance cut-off frequency	Disturbance cut-off frequency	0~40000	0.1 Hz	400.0		T
P1-44	20144	0X2001:45	Disturbance compensation gain	Disturbance compensation gain	0~100	%	0.0		T

R910 series servo drive for robots Simplified User Manual

P1 group		Advanced Commissioning Parameter Group							
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
P1-45	20145	0X2001:46	Disturbance observer inertia correction coefficient	Disturbance observation inertia correction coefficient	0~3000	%	100		
P1-46	20146	0X2001:47	Model tracking control mode	0:Do not use model tracking control 1:Enable model tracking control+rigid body model 2:Enable model tracking control+dual inertia model	0~2	%	0		
P1-47	20147	0X2001:48	Model tracking control gain	Model tracking control gain	0~30000	0.1 Hz	400		
P1-48	20148	0X2001:49	Model tracking control compensation gain	Model tracking control compensation gain	0~200	%	100		
P1-49	20149	0X2001:50	Dual inertia model resonance frequency	Dual inertia model resonant frequency	10~2500	0.1 Hz	700		
P1-50	20150	0X2001:51	Dual inertia model resonance frequency	Dual inertia model anti-resonant frequency	10~2500	0.1 Hz	500		
P1-51	20151	0X2001:52	Dual inertia model velocity feedforward value	Dual inertia model velocity feedforward value	0~100	%	0		
P1-52	20152	0X2001:53	Dual inertia model torque feedforward value	Dual inertia model torque feedforward value	0~100	%	0		
P1-53	20153	0X2001:54	Reserved						
P1-54	20154	0X2001:55	Reserved						
P1-55	20155	0X2001:56	Torque ripple suppression frequency	Torque ripple suppression frequency	1~50000	0.1 Hz	400		
P1-56	20156	0X2001:57	Torque Ripple Suppression Compensation	Torque Ripple Suppression Compensation	0~1000	0.10 %	0		
P1-57	20157	0X2001:58	Torque Ripple Suppression Phase	Torque Ripple Suppression Phase	0~2048		0		
P1-58	20158	0X2001:59	Torque Command Filter Cut-off Frequency	Cut off frequency of torque command filtering	1~16000	Hz	4000		
P1-59~P1-99	20159~20199	0X2001:60~0X2001:100	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	Set the range	Unit	Factory default	Attribute	Associated pattern
P2-00	20200	0X2002:01	Rated power of the motor	Rated power of the motor	1~65535	0.001 kW	75	R	
P2-01	20201	0X2002:02	Rated current of the motor	Rated current of the motor	1~65535	0.01A	500	R	S
P2-02	20202	0X2002:03	Maximum current of the motor	Maximum current of the motor	1~65535	0.01A	500	R	S
P2-03	20203	0X2002:04	Rated speed of the motor	Rated speed of the motor	100~6000	rpm	3000	R	P
P2-04	20204	0X2002:05	Maximum speed of the motor	Maximum speed of the motor	100~6000	rpm	6000	R	S
P2-05	20205	0X2002:06	Rated torque of the motor	Rated torque of the motor	10~65535	0.01 Nm	239	R	S
P2-06	20206	0X2002:07	Maximum torque of the motor	Maximum torque of the motor	10~65535	0.01 Nm	716	R	S
P2-07	20207	0X2002:08	Maximum speed torque value of motor	Maximum speed torque value of motor	10~65535	0.01 Nm	716	R	P
P2-08	20208	0X2002:09	Number of pole pairs in motor	Number of pole pairs in motor	2~100		5	R	S
P2-09	20209	0X2002:10	Motor back electromotive force coefficient	Motor back electromotive force coefficient	1~65535	0.01 mV/rpm	3330	R	
P2-10	20210	0X2002:11	Motor torque constant	Motor torque constant	1~65535	0.01 Nm/Arms	51	R	
P2-11	20211	0X2002:12	Motor rotor inertia	Motor rotor inertia	1~65535	0.01 kg.cm ²	130	R	
P2-12	20212	0X2002:13	Motor D-axis inductance	Motor D-axis inductance	1~65535	0.01 mH	387	R	
P2-13	20213	0X2002:14	Motor Q-axis inductance	Motor Q-axis inductance	1~65535	0.01 mH	327	R	
P2-14	20214	0X2002:15	Motor stator resistance	Motor stator resistance	1~65535	0.001Ω	500	R	
P2-15	20215	0X2002:16	Electrical time constant of the motor	Electrical time constant of the motor	1~65535	0.01 ms	654	R	
P2-16	20216	0X2002:17	Mechanical time constant of the motor	Mechanical time constant of the motor	1~65535	0.01 ms	24	R	
P2-17	20217	0X2002:18	Zero offset of the motor	Zero offset of the motor	1~65535		205	R	
P2-18~P2-49	20218~20249	0X2002:19~0X2002:50	Reserved	Reserved	0~65535		0		
P2-50	20250	0X2002:51	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	0X2002:52	Internal position mode Position 1 high position	Internal position mode position instruction 1 position	0~65535	p	0		
P2-52	20252	0X2002:53	Internal position mode Position 1 low						

R910 series servo drive for robots Simplified User Manual

P2 group	Motor Parameter Group								
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
			position						
P2-53	20253	0X2002:54	Internal position mode Position 2 high position	Internal position mode position instruction 2 position	0~65536	p	0		
P2-54	20254	0X2002:55	Internal position mode Position 2 low position						
P2-55	20255	0X2002:56	Reserved	Reserved	0~65535		0		
P2-56	20256	0X2002:57	Reserved	Reserved	0~65535		0		
P2-57	20257	0X2002:58	Reserved	Reserved	0~65535		0		
P2-58	20258	0X2002:59	Reserved	Reserved	0~65535		0		
P2-59	20259	0X2002:60	Reserved	Reserved	0~65535		0		
P2-60	20260	0X2002:61	Black box channel 1 configuration	Configure the black box data recording channel	0~96		2		
P2-61	20261	0X2002:62	Black box channel 2 configuration	Configure the black box data recording channel	0~96		3		
P2-62	20262	0X2002:63	Black box channel 3 configuration	Configure the black box data recording channel	0~96		6		
P2-63	20263	0X2002:64	Black box channel 4 configuration	Configure the black box data recording channel	0~96		9		
P2-64~P2-99	20264~20299	0X2002:65~0X2002:100	Reserved	Reserved	0~65535		0		

6.1.2.4 Function Parameter Group

P3 group		Function Parameter Group							
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
P3-00~P3-16	20300~20316	0X2003:01~0X2003:17	Reserved	Reserved	0~65535		0		
P3-17	20317	0X2003:18	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	0x0000~0x0011		0x0001		
P3-18	20318	0X2003:19	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 0A:ETHERCAT virtual output DO1 0B: ETHERCAT virtual output DO2 0C: ETHERCAT virtual output DO3 0D: ETHERCAT virtual output DO4 0E: ETHERCAT virtual output DO5 0F: ETHERCAT virtual output DO6 10: ETHERCAT virtual output DO7 11: ETHERCAT virtual output DO8 Hundreds&thousandths:00 :Positive logic 01:Anti logic	0x0000~0x0111		0x0000		
P3-19	20319	0X2003:20	DO2 function settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-20	20320	0X2003:21	DO3 function settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-21	20321	0X2003:22	DO4 function settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-22	20322	0X2003:23	DO5 function settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-23	20323	0X2003:24	DO6 function settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-24	20324	0X2003:25	DO7 function settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-25	20325	0X2003:26	DO8 function settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-26~P3-99	20326~20399	0X2003:27~0X2003:100	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	0X3000:01	Motor speed		rpm
d0-01	30001	0X3000:02	Reserved		
d0-02	30002	0X3000:03	DIDO status monitoring	The low 8 bits indicate DI1 to DI8, and the high 8 bits indicate DO1 to DO8	
d0-03	30003	0X3000:04	Low-order bits of encoder position feedback		
d0-04	30004	0X3000:05	High-order bits of encoder position feedback		
d0-05	30005	0X3000:06	Position bias		
d0-06	30006	0X3000:07	q-axis voltage		
d0-07	30007	0X3000:08	Bus synchronization correction cycle	Bus synchronization correction cycle	
d0-08	30008	0X3000:09	d-axis voltage		
d0-09	30009	0X3000:10	Average load rate		
d0-10	30010	0X3000:11	Multi-circle position		
d0-11	30011	0X3000:12	The encoder obtains the motor code	The encoder obtains the motor code	
d0-12	30012	0X3000:13	Position instruction high position		
d0-13	30013	0X3000:14	Position instruction low position		
d0-14	30014	0X3000:15	Reserved		
d0-15	30015	0X3000:16	Electrical angle of motor		
d0-16	30016	0X3000:17	Bus voltage		0.1V
d0-17	30017	0X3000:18	Historical lowest bus voltage		0.1V
d0-18	30018	0X3000:19	Historical highest bus voltage		0.1V
d0-19	30019	0X3000:20	Drive temperature		0.1℃
d0-20	30020	0X3000:21	Encoder fault count		
d0-21	30021	0X3000:22	Target position high position		
d0-22	30022	0X3000:23	Target position low position		
d0-23~ d0-27	30023~ 30027	0X3000:24~ 0X3000:28	Reserved		
d0-28	30028	0X3000:29	Motor overload rate	Motor overload rate	%
d0-29~ d0-32	30029~ 30032	0X3000:30~ 0X3000:33	Reserved		
d0-33	30033	0X3000:34	The original value of the U-phase current sampling		
d0-34	30034	0X3000:35	The original value of the V-phase current sampling		
d0-35	30035	0X3000:36	Reserved		
d0-36	30036	0X3000:37	Motor torque feedback		%
d0-37	30037	0X3000:38	Reserved		
d0-38	30038	0X3000:39	Motor torque setting		%
d0-39~ d0-50	30039~ 30050	0X3000:40~ 0X3000:51	Reserved		
d0-51	30051	0X3000:52	Maximum communication cycle of EtherCAT		
d0-52	30052	0X3000:53	Real-time communication cycle of EtherCAT		
d0-53~ d0-91	30053~ 30091	0X3000:54~ 0X3000:92	Reserved		
d0-92	30092	0X3000:93	ECT input port CRC error count	ECT input port CRC error count	
d0-93	30093	0X3000:94	ECT input port receives error count	ECT input port receives error count	
d0-94	30094	0X3000:95	ECT input port forwarding error count	ECT input port forwarding error count	
d0-95	30095	0X3000:96	ECT input port frame drop count	ECT input port frame drop count	
d0-96	30096	0X3000:97			
d0-97	30097	0X3000:98	Software version - year		
d0-98	30098	0X3000:99	Software version - Month/Day		
d0-99	30099	0X3000:100	Software version-SN		

6.1.2.6 Alarm Codes and Descriptions

ErrCode	Alarm Codes and Descriptions				
Function Codes	ETHERCAT encoding	Function code name	Fault principle	Exclusion method	Can it be reset
Er.001	0xFF01	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 24V power supply and the access signal are of the same origin	Y
Er.002	0xFF02	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 drive 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	0xFF03	Reserved			
Er.004	0xFF04	Internal communication anomaly	Abnormal internal communication drive	Need to return to the factory for repair	
Er.005	0xFF05	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	0xFF06	Reserved			
Er.007	0xFF07	Drive initialization in progress	Drive 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	0xFF08	Reserved			
Er.009	0xFF09	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	0xFF0A	Reserved			
Er.011	0xFF0B	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	0xFF0C	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	0xFF0D	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

R910 series servo drive for robots Simplified User Manual

Er.014	0xFF0E	Reserved			
ErrCode	Alarm Codes and Descriptions				
Function Codes	ETHERCAT encoding	Function code name	Fault principle	Exclusion method	Can it be reset
Er.015	0xFF0F	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	0xFF10	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	0xFF11	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	0xFF12	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	0xFF13	Reserved			
Er.020	0xFF14	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 meet the standards	Y
Er.021	0xFF15	Abnormal speed measurement	The single-turn encoder data is abnormal	Replace the motor	Y
Er.022	0xFF16	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	0xFF17	Reserved			
Er.024	0xFF18	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	0xFF19	Reserved			
Er.026	0xFF1A	Reserved			
Er.027	0xFF1B	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	0xFF1C	Reserved			
Er.029	0xFF1D	Reserved			
Er.030	0xFF1E	Reserved			

R910 series servo drive for robots Simplified User Manual

Er.031	0xFF1F	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 Codes and Descriptions				
Function Codes	ETHERCAT encoding	Function code name	Fault principle	Exclusion method	Can it be reset
Er.032	0xFF20	Parameter initialization error	EEPROM initialization error	Restore factory settings	Y
Er.033	0xFF21	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	0xFF22	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	0xFF23	Reserved			
Er.036	0xFF24	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	0xFF25	Reserved			
Er.038	0xFF26	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	0xFF27	Reserved			
Er.040	0xFF28	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	0xFF29	Reserved			
Er.042	0xFF2A	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	0xFF2B	Reserved			
Er.044	0xFF2C	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	0xFF2D	Reserved			
Er.046	0xFF2E	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	0xFF2F	Reserved			
Er.048	0xFF30	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	0xFF31	Reserved			

Er.050	0xFF32	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 Codes and Descriptions				
Function Codes	ETHERCAT encoding	Function code name	Fault principle	Exclusion method	Can it be reset
Er.051	0xFF33	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	0xFF34	Double STO trigger	Both channels of the Safe Torque Off (STO) are triggered	Check the wiring of the two safety circuits	Y
Er.053	0xFF35	STO1 trigger	First-channel safety torque shutoff trigger	Check the wiring of the first safety circuit	Y
Er.054	0xFF36	STO2 trigger	Second channel safety torque shutoff trigger	Check the wiring of the second safety circuit	Y
Er.055	0xFF37	STO detection error	Safety torque shutoff hardware detection error	Please consult the manufacturer's personnel	Y
Er.056	0xFF38	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	0xFF31~0xFF64	Reserved			
Er.227	0xFFE3	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	0X2100:01	Software version	Software version	0~65535		1000	R	
P0-01	22001	0X2100:02	Drive model	4:S5R0(5A) 220V 5:S8R0(8A) 220V 6:S015(15A) 220V 7:T6R0(6A) 380V 8:T8R5(8.5A) 380V 9:T12R(12A) 380V 10:T20R(20A) 380V 11:T25R(25A) 380V 12:T35R(35A) 380V	4~12		4	■	
P0-02	22002	0X2100:03	Motor code	Motor ID:1000~3500	1000~3500		1400	■	
P0-03	22003	0X2100:04	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	0x0000~0x1111		0x0000	H/■	P.S.T
P0-04	22004	0X2100:05	Manufacturer's functional parameters	0: Prohibit modifying P0-06/07 parameters 1: Allow modification of P0-06/07 parameters	0~1		0		
P0-05	22005	0X2100:06	Maximum speed threshold	0~6000	0~6000	rpm	4500		
P0-06	22006	0X2100:07	Forward maximum torque limit	0~300	0~300	%	300		
P0-07	22007	0X2100:08	Reverse maximum torque limit	0~300	0~300	%	300		
P0-08	22008	0X2100:09	Motor direction logic	0: CCW direction is the positive rotation direction 1: CW direction is the positive rotation direction	0~1		0	■	
P0-09	22009	0X2100:10	Encoder type setting	Units:Encoder type 0:Incremental type 1:Multi-turn absolute value type 2:Single-turn absolute value type Tens: Bit0: 0: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:	0x0000~0x2113				

R910 series servo drive for robots Simplified User Manual

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 Thousandths:Motor code recognition					
P0-10	22010	0X2100:11	Control method	0:TRQ 1:SPD 2:POS 3:EtherCAT 4:Gantry Follow Mode	0~13		0		PS
P0-11	22011	0X2100:12	Brake ON delay time	Delay Time from Servo-On Command to Brake Engagement	100~500	ms	100	■	P.S.T
P0-12	22012	0X2100:13	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	0X2100:14	Reserved						
P0-14	22014	0X2100:15	Reserved						
P0-15	22015	0X2100:16	Overload protection coefficient of motor	10~100	10~100	%	50		
P0-16	22016	0X2100:17	USB monitoring settings	Units:USB low-speed monitoring sampling interval, unit ms (0-5) 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 Thousandths:Reserved	0x0000~0x0035		0x0000	H/■	P.S.T
P0-17	22017	0X2100:18	The keypad enables control of characters	0:Servo OFF,1:Servo ON	0~1		0	■	
P0-18	22018	0X2100:19	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	0x0000~0x0011		0	■	
P0-19	22019	0X2100:20	Reserved						
P0-20	22020	0X2100:21	Load inertia ratio	The ratio of load inertia to motor inertia	0~3000	%	100		S
P0-21	22021	0X2100:22	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	0.1Hz	800		S
P0-22	22022	0X2100:23	The integral time constant of the velocity loop	The larger the integral, the stronger the integration effect, and the stronger the speed	0~20000	0.1Hz	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	0X2100:24	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	0X2100:25	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	0X2100:26	The integral time constant of the second velocity loop	The smaller the value, the stronger the integration effect, and the stronger the speed tracking ability, which needs to be coordinated with the speed loop gain and position loop gain	20~1000.0	0.1 Hz	125		S
P0-26	22026	0X2100:27	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	0X2100:28	Speed feedforward selection	Units:Speed feedforward selection 0:Internal speed feedforward(P0-28) 1:External given Tens:Torque feedforward selection 0:Internal torque feedforward 1:External given Hundreds:Multi segment gain selection 0:Default first set of gain parameters 1:Switching between two sets of gains based on (P0-72,73) Thousandths:Torque limit selection 0:Internal limit(P0-06,07) 1:External Limiting - Object Dictionary 0x6072- Axis 1	0x0000~0x1111		0	■	P
P0-28	22028	0X2100:29	Speed feedforward gain	Increasing can reduce the steady-state position deviation, but if it is too large, it can lead to overshoot	0~100	%	0		P
P0-29	22029	0X2100:30	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	0X2100:31	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	0X2100:32	DI1function	Units&tens: 00~05:Reserved 08:Emergency stop 09:Axis 1 origin switch 0A:Axis 2 origin switch 0B:Axis 3 origin switch 0C:Axis 1 positive limit 0D:Axis 2 positive limit 0E:Axis 3 positive limit 0F:Axis 1 negative limit 10:Axis 2 negative limit 11:Axis 3 negative limit 12:Axis 1 probe 1 13:Axis 2 probe 1 14:Axis 3 probe 1 15:Axis 1 probe 2 16:Axis 2 probe 2 17:Axis 3 probe 2 Hundreds: 0:Positive logic 1:Negative logic	0x0000~0x0117		000D		
P0-32	22032	0X2100:33	DI2function	Same as P0-31	0x0000~0x0117		0010		
P0-33	22033	0X2100:34	DI3function	Same as P0-31	0x0000~0x0117		000A		
P0-34	22034	0X2100:35	DI4function	Same as P0-31	0x0000~0x0117		0013		
P0-35	22035	0X2100:36	DI5function	Same as P0-31	0x0000~0x0117		0016		
P0-36	22036	0X2100:37	Reserved	Reserved					
P0-37	22037	0X2100:38	DI filtering time (DI1~DI6)	0~32ms	0~32		0		
P0-38	22038	0X2100:39	Electronic gear selection	0:Set value using object dictionary 0x6091 1:Use the values of P0-39(high bits) and P0-40 (low bits)	0~1		0		
P0-39	22039	0X2100:40	Number of position command pulses corresponding to one rotation of the motor (high position)	0~20000	0~20000		838	■	P
P0-40	22040	0X2100:41	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	0X2100:42	Moving average filter constant	--	0~200.0	ms	0		P
P0-42	22042	0X2100:43	First order low-pass filter constant	--	0~6000.0	ms	0		P
P0-43	22043	0X2100:44	Reserved	--	0~65535		0	L	P
P0-44	22044	0X2100:45	Reserved	--	0~16384		2		
P0-45	22045	0X2100:46	Reserved	--	0~65535		10000	L	P
P0-46	22046	0X2100:47	Reserved	--	0~16384		0		
P0-47	22047	0X2100:48	Reserved	--	4~16384		2500	■	P
P0-48	22048	0X2100:49	Reserved	--	0x0000~0x0001		0x0000	H/■	P
P0-49	22049	0X2100:50	Position deviation limit	0.1~50.0 turns	0.1~50.0		10.0	■	

R910 series servo drive for robots Simplified User Manual

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	0X2100:51	EtherCAT synchronization cycle	1~256 (x0.125ms)=[0.125ms~32ms]	1~256	0.125/ms	8		
P0-51	22051	0X2100:52	Quadrant Protuberance CCW Compensation Value	0~1000‰	0~1000		0		
P0-52	22052	0X2100:53	Quadrant Protuberance CW Compensation Value	0~1000‰	0~1000		0		
P0-53	22053	0X2100:54	Quadrant Protuberance Compensation Delay Time	0~1000 ms	0~1000		0		
P0-54	22054	0X2100:55	Quadrant Protuberance Compensation Filtering	0~100ms	0~100		0		
P0-55	22055	0X2100:56	Gravity compensation value	0~1000‰	0~1000		0		
P0-56	22056	0X2100:57	Gravity compensation polarity	0: CCW direction compensation 1: CW direction compensation	0~1		0		
P0-57	22057	0X2100:58	Notch filter frequency	10-5000 Hz	10~5000		100		
P0-58	22058	0X2100:59	Notch filter depth	0~20	0~20		10		
P0-59	22059	0X2100:60	Notch filter gain	0~500%	0~500		0		
P0-60	22060	0X2100:61	Zero offset of the magnetic pole	0~2048,<<12	0~2048		253		
P0-61	22061	0X2100:62	Speed command (for debugging)	Speed command reference set by Pn parameter	0~4500	rpm	100		
P0-62	22062	0X2100:63	Reserved						
P0-63	22063	0X2100:64	Reserved						
P0-64	22064	0X2100:65	Reserved						
P0-65	22065	0X2100:66	Ud-Kp	130	0~800		50		
P0-66	22066	0X2100:67	Ud-Ki	25	0~500		25		
P0-67	22067	0X2100:68	Uq-Kp	130	0~300		50		
P0-68	22068	0X2100:69	Uq-Ki	25	0~300		25		
P0-69	22069	0X2100:70	Reserved						
P0-70	22070	0X2100:71	Speed command polarity	0~1	0~1		0		
P0-71	22071	0X2100:72	Servo adaptive rigidity	20~20000(Prevent noddling phenomenon during the enabling process under gravity or load conditions)	20~20000		1200	▲	
P0-72	22072	0X2100:73	The first set of gain speed inflection points	/	0~6000	rpm	6000		
P0-73	22073	0X2100:74	The second set of gain speed inflection points	/	0~6000	rpm	6000		
P0-74~P0-79	22074~22079	0X2100:75~0X2100:80	Reserved						
P0-80	22080	0X2100:81	One-click aging parameters		0~6		0		

R910 series servo drive for robots Simplified User Manual

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	0X2100:82	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 Thousandths:Reserved 0:Normal mode	0x0000~0x111		0x0000	H	P.S.T
P0-82	22082	0X2100:83	Manufacturer calibration mode	Units:Manufacturer's current calibration mode 0:Close 1:Enable,The motor is only used for internal calibration by the manufacturer others:Reserved	0x0000~0x0001		0x0000	H	PST
P0-83	22083	0X2100:84	Reserved						
P0-84	22084	0X2100:85	VDC calibration	27800~37683	27800~37683		27800	K	P.S.T
P0-85	22085	0X2100:86	High position of Serial number (first test year)	2015~2029	2015~2029		2017	K	P.S.T
P0-86	22086	0X2100:87	Median of Serial number (first test month day)	0101~1231	0101~1231		907	K	P.S.T
P0-87	22087	0X2100:88	Low position of Serial number (first test Serial number)	0x0000~0xFFFF	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-88	22088	0X2100:89	Single board tooling testing QC label	0xA7E3:Pass Others:NG	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-89	22089	0X2100:90	Test the QC label before aging	0x8F68:Pass Others:NG	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-90	22090	0X2100:91	12-hour aging test label	0x5A5A:Pass Others:NG	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-91	22091	0X2100:92	Test label for the entire machine after aging	0xB80F:Pass Others:NG	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-92	22092	0X2100:93	Function password	E5DA:Clear the multi-turn values of the encoder	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-93	22093	0X2100:94	Reserved						
P0-94	22094	0X2100:95	Reserved	Reserved					
P0-95	22095	0X2100:96	Reserved	Reserved	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-96	22096	0X2100:97	Reserved	Reserved	0x0000~0xFFFF		0x0000	H/R/K	P.S.T
P0-97	22097	0X2100:98	Reserved	Reserved	0x0000~0xFFFF		0x0000	H/R/K	P.S.T
P0-98	22098	0X2100:99	Reserved	Reserved	0x0000~0xFFFF		0x0000	H/R/K	P.S.T
P0-99	22099	0X2100:100	Reserved	Reserved	0x0000~0xFFFF		0x0000	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	Set the range	Unit	Factory default	Attribute	Associated pattern
P1-00	22100	0X2101:01	Self adjusting mode	0:Manual adjustment 1:Rigidity grade adjustment 2:Position loop bandwidth + inertia self-adjustment (slow change) 3:Position loop bandwidth + inertia self-adjustment (rapid change)	0~3		0		
P1-01	22101	0X2101:02	Rigidity grade	Rigidity grade setting	1~32		12		
P1-02	22102	0X2101:03	Reserved	Reserved	0~65535		0		
P1-03	22103	0X2101:04	Inertia identification mode	0:Internal instruction round-trip motion mode 1:Controller command mode 2:Continuous automatic recognition	0~2		0		
P1-04	22104	0X2101:05	Inertia identification completion mark	0:Inertia identification is not completed 1:The inertia identification has been completed	0~1		0		
P1-05	22105	0X2101:06	Max Speed for Inertia Identification	Inertia identification allows for the maximum operating speed	100~3000	rpm	1000		
P1-06	22106	0X2101:07	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	0X2101:08	Maximum Movement Revolutions for Inertia Identification	Permitted Travel Revolutions for Inertia Identification	1~50	r	5		
P1-08	22108	0X2101:09	Waiting time for completion of single inertia identification	Waiting time for completion of single inertia identification motion	0~30000	ms	100		
P1-09	22109	0X2101:10	Reserved	Reserved	0~65535		0		
P1-10	22110	0X2101:11	Reserved	Reserved	0~65535		0		
P1-11	22111	0X2101:12	Reserved	Reserved	0~65535		0		
P1-12	22112	0X2101:13	Reserved	Reserved	0~65535		0		
P1-13	22113	0X2101:14	Reserved	Reserved	0~65535		0		
P1-14	22114	0X2101:15	Reserved	Reserved	0~65535		0		
P1-15	22115	0X2101:16	Vibration detection threshold	Vibration detection threshold	0~100		100		
P1-16	22116	0X2101:17	Vibration detection time	Vibration detection time	0~100		50		
P1-17	22117	0X2101:18	Frequency of the first notch filter	Notch filter frequency	0~65535		5000		
P1-18	22118	0X2101:19	Width of the first notch filter	Notch filter width	0~65535		2		
P1-19	22119	0X2101:20	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	Set the range	Unit	Factory default	Attribute	Associated pattern
P1-20	22120	0X2101:21	Frequency of the second notch filter	Notch filter frequency	0~65535		5000		
P1-21	22121	0X2101:22	Width of the second notch filter	Notch filter width	0~65535		2		
P1-22	22122	0X2101:23	Depth of the second notch filter	Notch filter depth	0~65535		0		
P1-23	22123	0X2101:24	Frequency of the third notch filter	Notch filter frequency	0~65535		5000		
P1-24	22124	0X2101:25	Width of the third notch filter	Notch filter width	0~65535		2		
P1-25	22125	0X2101:26	Depth of the third notch filter	Notch filter depth	0~65535		0		P
P1-26	22126	0X2101:27	Frequency of the fourth notch filter	Notch filter frequency	0~65535		5000		P
P1-27	22127	0X2101:28	Width of the fourth notch filter	Notch filter width	0~65535		2		P
P1-28	22128	0X2101:29	Depth of the fourth notch filter	Notch filter depth	0~65535		0		
P1-29	22129	0X2101:30	Frequency of the fifth notch filter	Notch filter frequency	0~65535		5000		
P1-30	22130	0X2101:31	Width of the fifth notch filter	Notch filter width	0~65535		2		S
P1-31	22131	0X2101:32	Depth of the fifth notch filter	Notch filter depth	0~65535		0		S
P1-32	22132	0X2101:33	End vibration suppression frequency	End positioning vibration suppression frequency	0~65535		2000		S
P1-33	22133	0X2101:34	End vibration suppression frequency compensation	End vibration suppression frequency compensation	0~200		100		S
P1-34	22134	0X2101:35	Maximum allowable weak magnetic current	Maximum allowable weak magnetic current	0~100		50		S
P1-35	22135	0X2101:36	Weak magnetic enablement	0:Disable the weak magnetic function 1:Enable the weak magnetic function	0~1		0		S
P1-36	22136	0X2101:37	Weak magnetic gain	Weak magnetic gain	0~300		100%		S
P1-37	22137	0X2101:38	Weak magnetic point velocity	Activate weak magnetic control speed	0~6000		4000		P
P1-38	22138	0X2101:39	PDFF controls the gain coefficient	PDFF controls the gain coefficient	0~100		100		
P1-39	22139	0X2101:40	Reserved						
P1-40	22140	0X2101:41	Reserved						T
P1-41	22141	0X2101:42	Reserved						T
P1-42	22142	0X2101:43	Disturbance compensation time coefficient	Disturbance compensation time coefficient	0~40000	0.1Hz	15.0		T
P1-43	22143	0X2101:44	Disturbance cut-off frequency	Disturbance cut-off frequency	0~40000	0.1Hz	400.0		T
P1-44	22144	0X2101:45	Disturbance compensation gain	Disturbance compensation gain	0~100	%	0.0		T
P1-45	22145	0X2101:46	Disturbance observer inertia correction coefficient	Disturbance observation inertia correction coefficient	0~3000	%	100		

P1 group	Advanced Commissioning Parameter Group								
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
P1-46	22146	0X2101:47	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	0X2101:48	Model tracking control gain	Model tracking control gain	0~30000	0.1Hz	400		
P1-48	22148	0X2101:49	Model tracking control compensation gain	Model tracking control compensation gain	0~200	%	100		
P1-49	22149	0X2101:50	Dual inertia model resonance frequency	Dual inertia model resonant frequency	1~100		1		
P1-50	22150	0X2101:51	Dual inertia model resonance frequency	Dual inertia model anti-resonant frequency	100~6000	rpm	3000		
P1-51	22151	0X2101:52	Dual inertia model velocity feedforward value	Dual inertia model velocity feedforward value	0~100	%	0		
P1-52	22152	0X2101:53	Dual inertia model torque feedforward value	Dual inertia model torque feedforward value	0~100	%	0		
P1-53	22153	0X2101:54	Reserved						
P1-54	22154	0X2101:55	Reserved						
P1-55	22155	0X2101:56	Torque ripple suppression frequency	Torque ripple suppression frequency	1~50000	0.1Hz	400		
P1-56	22156	0X2101:57	Torque Ripple Suppression Compensation	Torque Ripple Suppression Compensation	0~100	%	0		
P1-57	22157	0X2101:58	Torque Ripple Suppression Phase	Torque Ripple Suppression Phase	0~2048		0		
P1-58	22158	0X2101:59	Torque Command Filter Cut-off Frequency	Torque Command Filter Cut-off Frequency	1~16000	Hz	4000		
P1-59~ P1-99	22159~ 22199	0X2101:60~ 0X2101:100	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	Set the range	Unit	Factory default	Attribute	Associated pattern
P2-00	22200	0X2102:01	Rated power of the motor	Rated power of the motor	1~65535	0.001 kW	75	R	
P2-01	22201	0X2102:02	Rated current of the motor	Rated current of the motor	1~65535	0.01A	500	R	S
P2-02	22202	0X2102:03	Maximum current of the motor	Maximum current of the motor	1~65535	0.01A	500	R	S
P2-03	22203	0X2102:04	Rated speed of the motor	Rated speed of the motor	100~6000	rpm	3000	R	P
P2-04	22204	0X2102:05	Maximum speed of the motor	Maximum speed of the motor	100~6000	rpm	6000	R	S
P2-05	22205	0X2102:06	Rated torque of the motor	Rated torque of the motor	10~65535	0.01 Nm	239	R	S
P2-06	22206	0X2102:07	Maximum torque of the motor	Maximum torque of the motor	10~65535	0.01 Nm	716	R	S
P2-07	22207	0X2102:08	Maximum speed torque value of motor	Maximum speed torque value of motor	10~65535	0.01 Nm	716	R	P
P2-08	22208	0X2102:09	Number of pole pairs in motor	Number of pole pairs in motor	2~100		5	R	S
P2-09	22209	0X2102:10	Motor back electromotive force coefficient	Motor back electromotive force coefficient	1~65535	0.01 mV/rpm	3330	R	
P2-10	22210	0X2102:11	Motor torque constant	Motor torque constant	1~65535	0.01 Nm/Arms	51	R	
P2-11	22211	0X2102:12	Motor rotor inertia	Motor rotor inertia	1~65535	0.01 kg.cm ²	130	R	
P2-12	22212	0X2102:13	Motor D-axis inductance	Motor D-axis inductance	1~65535	0.01 mH	387	R	
P2-13	22213	0X2102:14	Motor Q-axis inductance	Motor Q-axis inductance	1~65535	0.01 mH	327	R	
P2-14	22214	0X2102:15	Motor stator resistance	Motor stator resistance	1~65535	0.001Ω	500	R	
P2-15	22215	0X2102:16	Electrical time constant of the motor	Electrical time constant of the motor	1~65535	0.01 ms	654	R	
P2-16	22216	0X2102:17	Mechanical time constant of the motor	Mechanical time constant of the motor	1~65535	0.01 ms	24	R	
P2-17	22217	0X2102:18	Zero offset of the motor	Zero offset of the motor	1~65535		205	R	
P2-18~P2-49	22218~22249	0X2102:19~0X2102:50	Reserved	Reserved	0~65535		0		
P2-50	22250	0X2102:51	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	0X2102:52	Internal position mode Position 1 high position	Internal position mode position instruction 1 position	0~65535	p	0		
P2-52	22252	0X2102:53	Internal position mode Position 1 low position						
P2-53	22253	0X2102:54	Internal position mode Position 2 high position	Internal position mode position instruction 2 position	0~65536	p	0		
P2-54	22254	0X2102:55	Internal position mode Position 2 low position						
P2-55~P2-59	22255~22259	0X2102:56~0X2102:60	Reserved	Reserved	0~65535		0		
P2-60	22260	0X2102:61	Black box channel 1 configuration	Configure the black box data recording channel	0~96		34		

R910 series servo drive for robots Simplified User Manual

P2 group	Motor Parameter Group								
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
P2-61	22261	0X2102:62	Black box channel 2 configuration	Configure the black box data recording channel	0~96		35		
P2-62	22262	0X2102:63	Black box channel 3 configuration	Configure the black box data recording channel	0~96		38		
P2-63	22263	0X2102:64	Black box channel 4 configuration	Configure the black box data recording channel	0~96		41		
P2-64	22264	0X2102:65	Internal sweep mode selection	0:Open-loop mode 1:Closed-loop mode	0~1		0		
P2-65	22265	0X2102:66	Sweep frequency starting frequency	Sweep frequency starting frequency	0~4000	Hz	0		
P2-66	22266	0X2102:67	Sweep frequency cut-off frequency	Sweep frequency cut-off frequency	0~4000	Hz	1000		
P2-67	22267	0X2102:68	Sweep frequency time	Sweep frequency time	0~1000	s	10		
P2-68	22268	0X2102:69	Sweep frequency current excitation amplitude	Sweep frequency current excitation amplitude	0~100	%	30		
P2-69~ P2-99	22269~ 22299	0X2102:70~ 0X2102:100	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	Set the range	Unit	Factory default	Attribute	Associated pattern
P3-00~P3-17	22300~22317	0X2103:01~0X2103:18	Reserved	Reserved	0~65535		0		
P3-18	22318	0X2103:19	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 0A: ETHERCAT virtual output DO1 0B: ETHERCAT virtual output DO2 0C: ETHERCAT virtual output DO3 0D: ETHERCAT virtual output DO4 0E: ETHERCAT virtual output DO5 0F: ETHERCAT virtual output DO6 10: ETHERCAT virtual output DO7 11: ETHERCAT virtual output DO8 Hundreds&thousandths: 00:Positive logic 01:Anti logic	0x0000~0x0111		0x0000		
P3-19	22319	0X2103:20	DO2 function Settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-20	22320	0X2103:21	DO3 function settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-21	22321	0X2103:22	DO4 function settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-22	22322	0X2103:23	DO5 function settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-23	22323	0X2103:24	DO6 function settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-24	22324	0X2103:25	DO7 function settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-25	22325	0X2103:26	DO8 function settings	Same as P3-18	0x0000~0x0111		0x0000		
P3-26~P3-99	22326~22399	0X2103:27~0X2103:100	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	0X3100:01	Motor speed		rpm
d0-01	32001	0X3100:02	Reserved		
d0-02	32002	0X3100:03	DIDO status monitoring	The low 8 bits indicate DI1 to DI8, and the high 8 bits indicate DO1 to DO8	
d0-03	32003	0X3100:04	Low-order bits of encoder position feedback		
d0-04	32004	0X3100:05	High-order bits of encoder position feedback		
d0-05	32005	0X3100:06	Position bias		
d0-06	32006	0X3100:07	q-axis voltage		
d0-07	32007	0X3100:08	Bus synchronization correction cycle	Bus synchronization correction cycle	
d0-08	32008	0X3100:09	d-axis voltage		
d0-09	32009	0X3100:10	Average load rate		
d0-10	32010	0X3100:11	Multi-circle position		
d0-11	32011	0X3100:12	The encoder obtains the motor code	The encoder obtains the motor code	
d0-12	32012	0X3100:13	Position instruction high position		
d0-13	32013	0X3100:14	Position instruction low position		
d0-14	32014	0X3100:15	Reserved		
d0-15	32015	0X3100:16	Electrical angle of motor		
d0-16	32016	0X3100:17	Bus voltage		0.1V
d0-17	32017	0X3100:18	Historical lowest bus voltage		0.1V
d0-18	32018	0X3100:19	Historical highest bus voltage		0.1V
d0-19	32019	0X3100:20	Drive temperature		0.1℃
d0-20	32020	0X3100:21	Encoder fault count		
d0-21	32021	0X3100:22	Target position high position		
d0-22	32022	0X3100:23	Target position low position		
d0-23~ d0-27	32023~ 32027	0X3100:24~ 0X3100:28	Reserved		
d0-28	32028	0X3100:29	Motor overload rate	Motor overload rate	%
d0-29~ d0-32	32029~ 32032	0X3100:30~ 0X3100:33	Reserved		
d0-33	32033	0X3100:34	The original value of the U-phase current sampling		
d0-34	32034	0X3100:35	The original value of the V-phase current sampling		
d0-35	32035	0X3100:36	Reserved		
d0-36	32036	0X3100:37	Motor torque feedback		%
d0-37	32037	0X3100:38	Reserved		
d0-38	32038	0X3100:39	Motor torque setting		%
d0-39~ d0-50	32039~ 32050	0X3100:40~ 0X3100:51	Reserved		
d0-51	32051	0X3100:52	Maximum communication cycle of EtherCAT		
d0-52	32052	0X3100:53	Real-time communication cycle of EtherCAT		
d0-53~ d0-91	32053~ 32091	0X3100:54~ 0X3100:92	Reserved		
d0-92	32092	0X3100:93	ECT output port CRC error count	ECT output port CRC error count	
d0-93	32093	0X3100:94	ECT output port receives error count	ECT output port receives error count	
d0-94	32094	0X3100:95	ECT output port forwarding error count	ECT output port forwarding error count	
d0-95	32095	0X3100:96	ECT output port frame drop count	ECT output port frame drop count	
d0-96	32096	0X3100:97	Reserved		
d0-97	32097	0X3100:98	Software version - year		
d0-98	32098	0X3100:99	Software version - Month/Day		
d0-99	32099	0X3100:100	Software version-SN		

6.1.3.6 Alarm Codes and Descriptions

ErrCode	Alarm Codes and Descriptions				
Function Codes	ETHERCAT encoding	Function code name	Fault principle	Exclusion method	Can it be reset
Er.001	0xFF01	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 24V power supply and the access signal are of the same origin	Y
Er.002	0xFF02	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 drive 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	0xFF03	Reserved			
Er.004	0xFF04	Internal communication anomaly	Abnormal internal communication drive	Need to return to the factory for repair	
Er.005	0xFF05	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	0xFF06	Reserved			
Er.007	0xFF07	Drive initialization in progress	Drive 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	0xFF08	Reserved			
Er.009	0xFF09	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	0xFF0A	Reserved			
Er.011	0xFF0B	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	0xFF0C	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	0xFF0D	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	0xFF0E	Reserved			
Er.015	0xFF0F	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

R910 series servo drive for robots Simplified User Manual

ErrCode	Alarm Codes and Descriptions				
Function Codes	ETHERCAT encoding	Function code name	Fault principle	Exclusion method	Can it be reset
Er.016	0xFF10	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	0xFF11	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	0xFF12	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	0xFF13	Reserved			
Er.020	0xFF14	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 meet the standards	Y
Er.021	0xFF15	Abnormal speed measurement	The single-turn encoder data is abnormal	Replace the motor	Y
Er.022	0xFF16	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	0xFF17	Reserved			
Er.024	0xFF18	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	0xFF19	Reserved			
Er.026	0xFF1A	Reserved			
Er.027	0xFF1B	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	0xFF1C	Reserved			
Er.029	0xFF1D	Reserved			
Er.030	0xFF1E	Reserved			
Er.031	0xFF1F	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	0xFF20	Parameter initialization error	EEPROM initialization error	Restore factory settings	Y
Er.033	0xFF21	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

R910 series servo drive for robots Simplified User Manual

ErrCode	Alarm Codes and Descriptions				
Function Codes	ETHERCAT encoding	Function code name	Fault principle	Exclusion method	Can it be reset
Er.034	0xFF22	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	0xFF23	Reserved			
Er.036	0xFF24	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	0xFF25	Reserved			
Er.038	0xFF26	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	0xFF27	Reserved			
Er.040	0xFF28	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	0xFF29	Reserved			
Er.042	0xFF2A	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	0xFF2B	Reserved			
Er.044	0xFF2C	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	0xFF2D	Reserved			
Er.046	0xFF2E	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	0xFF2F	Reserved			
Er.048	0xFF30	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	0xFF31	Reserved			
Er.050	0xFF32	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	0xFF33	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	0xFF34	Double STO trigger	Both channels of the Safe Torque Off (STO) are triggered	Check the wiring of the two safety circuits	Y
Er.053	0xFF35	STO1 trigger	First-channel safety torque shutoff trigger	Check the wiring of the first safety circuit	Y
Er.054	0xFF36	STO2 trigger	Second channel safety torque shutoff trigger	Check the wiring of the second safety circuit	Y
Er.055	0xFF37	STO detection	Safety torque shutoff	Please consult the manufacturer's personnel	Y

ErrCode	Alarm Codes and Descriptions				
Function Codes	ETHERCAT encoding	Function code name	Fault principle	Exclusion method	Can it be reset
		error	hardware detection error		
Er.056	0xFF38	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	0xFF31~0xFF64	Reserved			
Er.227	0xFFE3	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	Set the range	Unit	Factory default	Attribute	Associated pattern
P0-00	24000	0X2200:01	Software version	Software version	0~65535		1000	R	
P0-01	24001	0X2200:02	Drive model	4:S5R0(5A)220V 5:S8R0(8A)220V 6:S015(15A)220V 7:T6R0(6A)380V 8:T8R5(8.5A)380V 9:T12R(12A)380V 10:T20R(20A)380V 11:T25R(25A)380V 12:T35R(35A)380V	4~12		4	■	
P0-02	24002	0X2200:03	Motor code	Motor ID:1000~3500	1000~3500		1400	■	
P0-03	24003	0X2200:04	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	0x0000~0x1111		0x0000	H/■	P.S.T
P0-04	24004	0X2200:05	Manufacturer's functional parameters	0: Prohibit modifying P0-06/07 parameters 1: Allow modification of P0-06/07 parameters	0~1		0		
P0-05	24005	0X2200:06	Maximum speed threshold	0~6000	0~6000	rpm	4500		
P0-06	24006	0X2200:07	Forward maximum torque limit	0~300	0~300	%	300		
P0-07	24007	0X2200:08	Reverse maximum torque limit	0~300	0~300	%	300		
P0-08	24008	0X2200:09	Motor direction logic	0: CCW direction is the positive rotation direction 1: CW direction is the positive rotation direction	0~1		0	■	
P0-09	24009	0X2200:10	Encoder type setting	Units:encoder type 0:Incremental type, 1:Multi-turn absolute value type 2:Single-turn absolute value type	0x0000~0x2113				

R910 series servo drive for robots Simplified User Manual

P0 group	Basic Parameter Group								
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
				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: Bit4: 0:Ethercat speed unit selected in rpm 1:Ethercat speed unit selected in pp/s Thousandths:Motor code recognition					
P0-10	24010	0X2200:11	Control method	0:TRQ 1:SPD 2:POS 3:EtherCAT 4:Gantry Follow Mode	0~13		0		PS
P0-11	24011	0X2200:12	Brake ON delay time	Delay Time from Servo-On Command to Brake Engagement	100~500	ms	100	■	P.S.T
P0-12	24012	0X2200:13	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	0X2200:14	Reserved						
P0-14	24014	0X2200:15	Reserved						
P0-15	24015	0X2200:16	Overload protection coefficient of motor	10~100	10~100	%	50		
P0-16	24016	0X2200:17	USB monitoring settings	Units:USB low-speed monitoring sampling interval, unit ms (0-5) 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 Thousandths:Reserved	0x0000 ~ 0x0035		0x0000	H/■	P.S.T
P0-17	24017	0X2200:18	The keypad enables control of characters	0:Servo OFF,1:Servo ON	0~1		0	■	
P0-18	24018	0X2200:19	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	0x0000 ~ 0x0011		0	■	

R910 series servo drive for robots Simplified User Manual

P0 group		Basic Parameter Group							
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
				enable 0:Do not enable associated alarm 1:Enable associated alarm					
P0-19	24019	0X2200:20	Reserved						
P0-20	24020	0X2200:21	Load inertia ratio	The ratio of load inertia to motor inertia	0~3000	%	100		S
P0-21	24021	0X2200:22	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	0X2200:23	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	0X2200:24	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	0X2200:25	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	0X2200:26	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	0X2200:27	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	0X2200:28	Speed feedforward selection	Units:Speed feedforward selection 0:Internal speed feedforward(P0-28) 1:External given Tens:Torque feedforward selection 0:Internal torque feedforward 1:External given Hundreds:Multi	0x0000 ~ 0x1111		0	■	P

R910 series servo drive for robots Simplified User Manual

P0 group	Basic Parameter Group								
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the 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) Thousandths:Torque limit selection 0:Internal limit(P0-06,07) 1:External Limiting - Object Dictionary 0x6072- Axis 1					
P0-28	24028	0X2200:29	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	0X2200:30	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	0X2200:31	Reserved	Reserved	50~1000		100		P
P0-31	24031	0X2200:32	DI1 function	Units&tens: 00~05:Reserved 08:Emergency stop 09:Axis 1 origin switch 0A:Axis 2 origin switch 0B:Axis 3 origin switch 0C:Axis 1 positive limit 0D:Axis 2 positive limit 0E:Axis 3 positive limit 0F:Axis 1 negative limit 10:Axis 2 negative limit 11:Axis 3 negative limit 12:Axis 1 probe 1 13:Axis 2 probe 1 14:Axis 3 probe 1 15:Axis 1 probe 2 16:Axis 2 probe 2 17:Axis 3 probe 2 Hundreds: 0:Positive logic 1:Negative logic	0x0000 ~ 0x0117		000E		
P0-32	24032	0X2200:33	DI2 function	Same as P0-31	0x0000 ~ 0x0117		0011		
P0-33	24033	0X2200:34	DI3function	Same as P0-31	0x0000 ~ 0x0117		000B		
P0-34	24034	0X2200:35	DI4function	Same as P0-31	0x0000 ~ 0x0117		0014		
P0-35	24035	0X2200:36	DI5 function	Same as P0-31	0x0000 ~ 0x0117		0017		
P0-36	24036	0X2200:37	Reserved	Reserved					
P0-37	24037	0X2200:38	DI filtering time (DI1~DI6)	0~32ms	0~32		0		
P0-38	24038	0X2200:39	Electronic gear selection	0:Set value using object dictionary 0x6091 1:Use the values of P0-39(high bits) and P0-40 (low bits)	0~1		0		
P0-39	24039	0X2200:40	Number of	0~20000	0~2000		838	■	P

R910 series servo drive for robots Simplified User Manual

P0 group		Basic Parameter Group							
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
			position command pulses corresponding to one rotation of the motor (high position)		0				
P0-40	24040	0X2200:41	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	0X2200:42	Moving average filter constant	--	0~200.0	ms	0		P
P0-42	24042	0X2200:43	First order low-pass filter constant	--	0~6000.0	ms	0		P
P0-43	24043	0X2200:44	Reserved	--	0~65535		0	L	P
P0-44	24044	0X2200:45	Reserved	--	0~16384				
P0-45	24045	0X2200:46	Reserved	--	0~65535		10000	L	P
P0-46	24046	0X2200:47	Reserved	--	0~16384		0		
P0-47	24047	0X2200:48	Reserved	--	4~16384		2500	■	P
P0-48	24048	0X2200:49	Reserved	--	0x0000~0x0001		0x0000	H/■	P
P0-49	24049	0X2200:50	Position deviation limit	0.1~50.0 turns	0.1~50.0		10.0	■	
P0-50	24050	0X2200:51	EtherCAT synchronization cycle	1~256(x0.125ms)=[0.125ms~32ms]	1~256	0.125/ms	8		
P0-51	24051	0X2200:52	Quadrant Protuberance CCW Compensation Value	0~1000‰	0~1000		0		
P0-52	24052	0X2200:53	Quadrant Protuberance CW Compensation Value	0~1000‰	0~1000		0		
P0-53	24053	0X2200:54	Quadrant Protuberance Compensation Delay Time	0~1000 ms	0~1000		0		
P0-54	24054	0X2200:55	Quadrant Protuberance Compensation Filtering	0~100ms	0~100		0		
P0-55	24055	0X2200:56	Gravity compensation value	0~1000‰	0~1000		0		
P0-56	24056	0X2200:57	Gravity compensation polarity	0: CCW direction compensation 1: CW direction compensation	0~1		0		
P0-57	24057	0X2200:58	Notch filter frequency	10-5000 Hz	10~5000		100		
P0-58	24058	0X2200:59	Notch filter depth	0~20	0~20		10		
P0-59	24059	0X2200:60	Notch filter gain	0~500%	0~500		0		
P0-60	24060	0X2200:61	Zero offset of the magnetic pole	0~2048,<<12	0~2048		253		

R910 series servo drive for robots Simplified User Manual

P0 group	Basic Parameter Group								
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
P0-61	24061	0X2200:62	Speed command (for debugging)	Speed command reference set by Pn parameter	0~4500	rpm	100		
P0-62~P0-64	24062~24064	0X2200:63~0X2200:65	Reserved						
P0-65	24065	0X2200:66	Ud-Kp	130	0~800		50		
P0-66	24066	0X2200:67	Ud-Ki	25	0~500		25		
P0-67	24067	0X2200:68	Uq-Kp	130	0~300		50		
P0-68	24068	0X2200:69	Uq-Ki	25	0~300		25		
P0-69	24069	0X2200:70	Reserved						
P0-70	24070	0X2200:71	Speed command polarity	0~1	0~1		0		
P0-71	24071	0X2200:72	Servo adaptive rigidity	20~20000(Prevent nodding phenomenon during the enabling process under gravity or load conditions)	0~20000		1200	▲	
P0-72	24072	0X2200:73	The first set of gain speed inflection points	/	0~6000	rpm	6000		
P0-73	24073	0X2200:74	The second set of gain speed inflection points	/	0~6000	rpm	6000		
P0-74~P0-79	24074~24079	0X2200:75~0X2200:80	Reserved						
P0-80	24080	0X2200:81	One-click aging parameters		0~6		0		
P0-81	24081	0X2200:82	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	0x0000~0x111		0x0000	H	P.S.T
P0-82	24082	0X2200:83	Manufacturer calibration mode	Units:Manufacturer's current calibration mode 0:Close 1:Enable,The motor is only used for internal calibration by the manufacturer others:Reserved	0x0000~0x0001		0x0000	H	PST
P0-83	24083	0X2200:84	Reserved						
P0-84	24084	0X2200:85	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	0X2200:87	Median of Serial number (first test month day)	0101~1231	0101~1231		907	K	P.S.T
P0-87	24087	0X2200:88	Low position of Serial number (first test Serial number)	0x0000~0xFFFF	0x0000~0xFFFF		0x0000	H/K	P.S.T
P0-88	24088	0X2200:89	Single board tooling testing QC label	0xA7E3:Pass Others:NG	0x0000~0xFFFF		0x0000	H/K	P.S.T

R910 series servo drive for robots Simplified User Manual

P0 group	Basic Parameter Group								
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
P0-89	24089	0X2200:90	Test the QC label before aging	0x8F68:Pass Others:NG	0x0000 ~ 0xFFFF		0x0000	H/K	P.S.T
P0-90	24090	0X2200:91	12-hour aging test label	0x5A5A:Pass Others:NG	0x0000 ~ 0xFFFF		0x0000	H/K	P.S.T
P0-91	24091	0X2200:92	Test label for the entire machine after aging	0xB80F:Pass Others:NG	0x0000 ~ 0xFFFF		0x0000	H/K	P.S.T
P0-92	24092	0X2200:93	Function password	E5DA:Clear the multi-turn values of the encoder	0x0000 ~ 0xFFFF		0x0000	H/K	P.S.T
P0-93	24093	0X2200:94	Reserved						
P0-94	24094	0X2200:95	Reserved	Reserved					
P0-95	24095	0X2200:96	Reserved	Reserved	0x0000 ~ 0xFFFF		0x0000	H/K	P.S.T
P0-96	24096	0X2200:97	Reserved	Reserved	0x0000 ~ 0xFFFF		0x0000	H/R/K	P.S.T
P0-97	24097	0X2200:98	Reserved	Reserved	0x0000 ~ 0xFFFF		0x0000	H/R/K	P.S.T
P0-98	24098	0X2200:99	Reserved	Reserved	0x0000 ~ 0xFFFF		0x0000	H/R/K	P.S.T
P0-99	24099	0X2200:100	Reserved	Reserved	0x0000 ~ 0xFFFF		0x0000	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	Set the range	Unit	Factory default	Attribute	Associated pattern
P1-00	24100	0X2201:01	Self adjusting mode	0:Manual adjustment 1:Rigidity grade adjustment 2:Position loop bandwidth + inertia self-adjustment (slow change) 3:Position loop bandwidth + inertia self-adjustment (rapid change)	0~3		0		
P1-01	24101	0X2201:02	Rigidity grade	Rigidity grade setting	1~32		12		
P1-02	24102	0X2201:03	Reserved	Reserved	0~65535		0		
P1-03	24103	0X2201:04	Inertia identification mode	0:Internal instruction round-trip motion mode 1:Controller command mode 2:Continuous automatic recognition	0~2		0		
P1-04	24104	0X2201:05	Inertia identification completion mark	0:Inertia identification is not completed 1:The inertia identification has been completed	0~1		0		
P1-05	24105	0X2201:06	Max Speed for Inertia Identification	Inertia identification allows for the maximum operating speed	100~3000	rpm	1000		
P1-06	24106	0X2201:07	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	0X2201:08	Maximum Movement Revolutions for Inertia Identification	Permitted Travel Revolutions for Inertia Identification	1~50	r	5		
P1-08	24108	0X2201:09	Waiting time for completion of single inertia identification	Waiting time for completion of single inertia identification motion	0~30000	ms	100		
P1-09~P1-14	24109~24114	0X2201:10~0X2201:15	Reserved	Reserved	0~65535		0		
P1-15	24115	0X2201:16	Vibration detection threshold	Vibration detection threshold	0~100		100		
P1-16	24116	0X2201:17	Vibration detection time	Vibration detection time	0~100		50		
P1-17	24117	0X2201:18	Frequency of the first notch filter	Notch filter frequency	0~65535		5000		
P1-18	24118	0X2201:19	Width of the first notch filter	Notch filter width	0~65535		2		
P1-19	24119	0X2201:20	Depth of the first notch filter	Notch filter depth	0~65535		0		
P1-20	24120	0X2201:21	Frequency of the second notch filter	Notch filter frequency	0~65535		5000		
P1-21	24121	0X2201:22	Width of the second notch filter	Notch filter width	0~65535		2		
P1-22	24122	0X2201:23	Depth of the second notch filter	Notch filter depth	0~65535		0		
P1-23	24123	0X2201:24	Frequency of the third notch filter	Notch filter frequency	0~65535		5000		
P1-24	24124	0X2201:25	Width of the third notch filter	Notch filter width	0~65535		2		
P1-25	24125	0X2201:26	Depth of the third notch filter	Notch filter depth	0~65535		0		P
P1-26	24126	0X2201:27	Frequency of the fourth notch filter	Notch filter frequency	0~65535		5000		P
P1-27	24127	0X2201:28	Width of the fourth notch filter	Notch filter width	0~65535		2		P
P1-28	24128	0X2201:29	Depth of the fourth	Notch filter depth	0~65535		0		

R910 series servo drive for robots Simplified User Manual

P1 group	Advanced Commissioning Parameter Group								
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
			notch filter						
P1-29	24129	0X2201:30	Frequency of the fifth notch filter	Notch filter frequency	0~65535		5000		
P1-30	24130	0X2201:31	Width of the fifth notch filter	Notch filter width	0~65535		2		S
P1-31	24131	0X2201:32	Depth of the fifth notch filter	Notch filter depth	0~65535		0		S
P1-32	24132	0X2201:33	End vibration suppression frequency	End positioning vibration suppression frequency	0~65535		2000		S
P1-33	24133	0X2201:34	End vibration suppression frequency compensation	End vibration suppression frequency compensation	0~200		100		S
P1-34	24134	0X2201:35	Maximum allowable weak magnetic current	Maximum allowable weak magnetic current	0~100		50		S
P1-35	24135	0X2201:36	Weak magnetic enablement	0:Disable the weak magnetic function 1:Enable the weak magnetic function	0~1		0		S
P1-36	24136	0X2201:37	Weak magnetic gain	Weak magnetic gain	0~300		100%		S
P1-37	24137	0X2201:38	Weak magnetic point velocity	Activate weak magnetic control speed	0~6000		4000		P
P1-38	24138	0X2201:39	PDFF controls the gain coefficient	PDFF controls the gain coefficient	0~100		100		
P1-39	24139	0X2201:40	Reserved						
P1-40	24140	0X2201:41	Reserved						T
P1-41	24141	0X2201:42	Reserved						T
P1-42	24142	0X2201:43	Disturbance compensation time coefficient	Disturbance compensation time coefficient	0~40000	0.1 Hz	15.0		T
P1-43	24143	0X2201:44	Disturbance cut-off frequency	Disturbance cut-off frequency	0~40000	0.1 Hz	400.0		T
P1-44	24144	0X2201:45	Disturbance compensation gain	Disturbance compensation gain	0~100	%	0.0		T
P1-45	24145	0X2201:46	Disturbance observer inertia correction coefficient	Disturbance observation inertia correction coefficient	0~3000	%	100		
P1-46	24146	0X2201:47	Model tracking control mode	0:Do not use model tracking control 1:Enable model tracking control+rigid body model 2:Enable model tracking control+dual inertia model	0~300	%	10		
P1-47	24147	0X2201:48	Model tracking control gain	Model tracking control gain	0~30000	0.1 Hz	400		
P1-48	24148	0X2201:49	Model tracking control compensation gain	Model tracking control compensation gain	0~200	%	100		
P1-49	24149	0X2201:50	Dual inertia model resonance frequency	Dual inertia model resonant frequency	1~100		1		
P1-50	24150	0X2201:51	Dual inertia model resonance frequency	Dual inertia model anti-resonant frequency	100~6000	rpm	3000		
P1-51	24151	0X2201:52	Dual inertia model velocity feedforward value	Dual inertia model velocity feedforward value	0~100	%	0		
P1-52	24152	0X2201:53	Dual inertia model torque feedforward value	Dual inertia model torque feedforward value	0~100	%	0		
P1-53	24153	0X2201:54	Reserved						
P1-54	24154	0X2201:55	Reserved						

R910 series servo drive for robots Simplified User Manual

P1 group	Advanced Commissioning Parameter Group								
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Set the range	Unit	Factory default	Attribute	Associated pattern
P1-55	24155	0X2201:56	Torque ripple suppression frequency	Torque ripple suppression frequency	1~50000	0.1 Hz	400		
P1-56	24156	0X2201:57	Torque Ripple Suppression Compensation	Torque Ripple Suppression Compensation	0~100	%	0		
P1-57	24157	0X2201:58	Torque Ripple Suppression Phase	Torque Ripple Suppression Phase	0~2048		0		
P1-58	24158	0X2201:59	Torque Command Filter Cut-off Frequency	Torque Command Filter Cut-off Frequency	1~16000	Hz	4000		
P1-59~ P1-99	24159~ 24199	0X2201:60~ 0X2201:100	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	Set the range	Unit	Factory default	Attribute	Associated pattern
P2-00	24200	0X2202:01	Rated power of the motor		1~65535	0.001 kW	75	R	
P2-01	24201	0X2202:02	Rated current of the motor		1~65535	0.01A	500	R	S
P2-02	24202	0X2202:03	Maximum current of the motor		1~65535	0.01A	500	R	S
P2-03	24203	0X2202:04	Rated speed of the motor		100~6000	rpm	3000	R	P
P2-04	24204	0X2202:05	Maximum speed of the motor		100~6000	rpm	6000	R	S
P2-05	24205	0X2202:06	Rated torque of the motor		10~65535	0.01 Nm	239	R	S
P2-06	24206	0X2202:07	Maximum torque of the motor		10~65535	0.01 Nm	716	R	S
P2-07	24207	0X2202:08	Maximum speed torque value of motor		10~65535	0.01 Nm	716	R	P
P2-08	24208	0X2202:09	Number of pole pairs in motor		2~100		5	R	S
P2-09	24209	0X2202:10	Motor back electromotive force coefficient		1~65535	0.01 mV/rpm	3330	R	
P2-10	24210	0X2202:11	Motor torque constant		1~65535	0.01 Nm/Arms	51	R	
P2-11	24211	0X2202:12	Motor rotor inertia		1~65535	0.01 kg.cm2	130	R	
P2-12	24212	0X2202:13	Motor D-axis inductance		1~65535	0.01 mH	387	R	
P2-13	24213	0X2202:14	Motor Q-axis inductance		1~65535	0.01 mH	327	R	
P2-14	24214	0X2202:15	Motor stator resistance		1~65535	0.001Ω	500	R	
P2-15	24215	0X2202:16	Electrical time constant of the motor		1~65535	0.01 ms	654	R	
P2-16	24216	0X2202:17	Mechanical time constant of the motor		1~65535	0.01 ms	24	R	
P2-17	24217	0X2202:18	Zero offset of the motor		1~65535		205	R	
P2-18~ P2-99	24218~ 24299	0X2202:19~ 0X2202:100							

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	Set the range	Unit	Factory default	Attribute	Associated pattern
P3-00~ P3-17	24300~ 24317	0X2203:01~ 0X2203:18	Reserved	Reserved	0~ 65535		0		
P3-18	24318	0X2203:19	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 0A:ETHERCAT virtual output DO1 0B:ETHERCAT virtual output DO2 0C:ETHERCAT virtual output DO3 0D:ETHERCAT virtual output DO4 0E:ETHERCAT virtual output DO5 0F:ETHERCAT virtual output DO6 10:ETHERCAT virtual output DO7 11:ETHERCAT virtual output DO8 Hundreds&thousandths: 00:Positive logic 01:Anti logic	0x0000~ 0x0111		0x0000		
P3-19	24319	0X2203:20	DO2 function settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-20	24320	0X2203:21	DO3 function settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-21	24321	0X2203:22	DO4 function settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-22	24322	0X2203:23	DO5 function settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-23	24323	0X2203:24	DO6 function settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-24	24324	0X2203:25	DO7 function settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-25	24325	0X2203:26	DO8 function settings	Same as P3-18	0x0000~ 0x0111		0x0000		
P3-26~ P3-99	24326~ 24399	0X2203:27~ 0X2203:100	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	0X3200:01	Motor speed		rpm
d0-01	34001	0X3200:02	Reserved		
d0-02	34002	0X3200:03	DIDO status monitoring	The low 8 bits indicate DI1 to DI8, and the high 8 bits indicate DO1 to DO8	
d0-03	34003	0X3200:04	Low-order bits of encoder position feedback		
d0-04	34004	0X3200:05	High-order bits of encoder position feedback		
d0-05	34005	0X3200:06	Position bias		
d0-06	34006	0X3200:07	q-axis voltage		
d0-07	34007	0X3200:08	Bus synchronization correction cycle	Bus synchronization correction cycle	
d0-08	34008	0X3200:09	d-axis voltage		
d0-09	34009	0X3200:10	Average load rate		
d0-10	34010	0X3200:11	Multi-circle position		
d0-11	34011	0X3200:12	The encoder obtains the motor code	The encoder obtains the motor code	
d0-12	34012	0X3200:13	Position instruction high position		
d0-13	34013	0X3200:14	Position instruction low position		
d0-14	34014	0X3200:15	Reserved		
d0-15	34015	0X3200:16	Electrical angle of motor		
d0-16	34016	0X3200:17	Bus voltage		0.1V
d0-17	34017	0X3200:18	Historical lowest bus voltage		0.1V
d0-18	34018	0X3200:19	Historical highest bus voltage		0.1V
d0-19	34019	0X3200:20	Drive temperature		0.1℃
d0-20	34020	0X3200:21	Encoder fault count		
d0-21	34021	0X3200:22	Target position high position		
d0-22	34022	0X3200:23	Target position low position		
d0-23	34023	0X3200:24	Reserved		
d0-24	34024	0X3200:25	Reserved		
d0-25	34025	0X3200:26	Reserved		
d0-26	34026	0X3200:27	Reserved		
d0-27	34027	0X3200:28	Reserved		
d0-28	34028	0X3200:29	Motor overload rate	Motor overload rate	%
d0-29	34029	0X3200:30	Reserved		
d0-30	34030	0X3200:31	Reserved		
d0-31	34031	0X3200:32	Reserved		
d0-32	34032	0X3200:33	Reserved		
d0-33	34033	0X3200:34	The original value of the U-phase current sampling		
d0-34	34034	0X3200:35	The original value of the V-phase current sampling		
d0-35	34035	0X3200:36	Reserved		

R910 series servo drive for robots Simplified User Manual

d0 group	Monitoring Parameter Group				
Function Codes	MODBUS mapped address	ETHERCAT mapped address	Function code name	Parameter description	Unit
d0-36	34036	0X3200:37	Motor torque feedback		%
d0-37	34037	0X3200:38	Reserved		
d0-38	34038	0X3200:39	Motor torque setting		%
d0-39~ d0-50	34039~ 34050	0X3200:40~ 0X3200:51	Reserved		
d0-51	34051	0X3200:52	Maximum communication cycle of EtherCAT		
d0-52	34052	0X3200:53	Real-time communication cycle of EtherCAT		
d0-53~ d0-91	34053~ 34091	0X3200:54~ 0X3200:92	Reserved		
d0-92	34092	0X3200:93	ECT input port CRC error count	ECT input port CRC error count	
d0-93	34093	0X3200:94	ECT input port receives error count	ECT input port receives error count	
d0-94	34094	0X3200:95	ECT input port forwarding error count	ECT input port forwarding error count	
d0-95	34095	0X3200:96	ECT input port frame drop count	ECT input port frame drop count	
d0-96	34096	0X3200:97	Reserved		
d0-97	34097	0X3200:98	Software version - year		
d0-98	34098	0X3200:99	Software version - Month/Day		
d0-99	34099	0X3200:100	Software version-SN		

6.1.4.6 Alarm Codes and Descriptions

ErrCode	Alarm Codes and Descriptions				
Function Codes	ETHERCAT encoding	Function code name	Fault principle	Exclusion method	Can it be reset
Er.001	0xFF01	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 24V power supply and the access signal are of the same origin	Y
Er.002	0xFF02	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 drive 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	0xFF03	Reserved			
Er.004	0xFF04	Internal communication anomaly	Abnormal internal communication drive	Need to return to the factory for repair	
Er.005	0xFF05	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	0xFF06	Reserved			
Er.007	0xFF07	Drive initialization in progress	Drive 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	0xFF08	Reserved			
Er.009	0xFF09	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	0xFF0A	Reserved			
Er.011	0xFF0B	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	0xFF0C	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	0xFF0D	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	0xFF0E	Reserved			
Er.015	0xFF0F	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	0xFF10	Failed to write	EEPROM data error	1,Restore factory settings	Y

ErrCode	Alarm Codes and Descriptions				
Function Codes	ETHERCAT encoding	Function code name	Fault principle	Exclusion method	Can it be reset
		the EEPROM		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	
Er.017	0xFF11	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	0xFF12	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	0xFF13	Reserved			
Er.020	0xFF14	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 meet the standards	Y
Er.021	0xFF15	Abnormal speed measurement	The single-turn encoder data is abnormal	Replace the motor	Y
Er.022	0xFF16	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	0xFF17	Reserved			
Er.024	0xFF18	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	0xFF19	Reserved			
Er.026	0xFF1A	Reserved			
Er.027	0xFF1B	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	0xFF1C	Reserved			
Er.029	0xFF1D	Reserved			
Er.030	0xFF1E	Reserved			
Er.031	0xFF1F	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	0xFF20	Parameter initialization error	EEPROM initialization error	Restore factory settings	Y

ErrCode	Alarm Codes and Descriptions				
Function Codes	ETHERCAT encoding	Function code name	Fault principle	Exclusion method	Can it be reset
Er.033	0xFF21	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	0xFF22	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	0xFF23	Reserved			
Er.036	0xFF24	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	0xFF25	Reserved			
Er.038	0xFF26	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	0xFF27	Reserved			
Er.040	0xFF28	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	0xFF29	Reserved			
Er.042	0xFF2A	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	0xFF2B	Reserved			
Er.044	0xFF2C	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	0xFF2D	Reserved			
Er.046	0xFF2E	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	0xFF2F	Reserved			
Er.048	0xFF30	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	0xFF31	Reserved			
Er.050	0xFF32	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	0xFF33	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 Codes and Descriptions				
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	0xFF34	Double STO trigger	Both channels of the Safe Torque Off (STO) are triggered	Check the wiring of the two safety circuits	Y
Er.053	0xFF35	STO1 trigger	First-channel safety torque shutoff trigger	Check the wiring of the first safety circuit	Y
Er.054	0xFF36	STO2 trigger	Second channel safety torque shutoff trigger	Check the wiring of the second safety circuit	Y
Er.055	0xFF37	STO detection error	Safety torque shutoff hardware detection error	Please consult the manufacturer's personnel	Y
Er.056	0xFF38	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	0xFF31~ 0xFF64	Reserved			
Er.227	0xFFE3	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 connectors as EtherCAT communication ports. The terminal interface is shown in the figure below. The ECAT-IN interface on the lower front side of the drive is the input interface, and ECAT-OUT is the output interface.

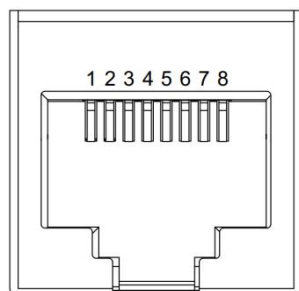


Figure 6-1 Pin definition

Table 7-1 Communication Signal Connector Pin Definitions

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) Ethernet cables or high-quality shielded network cables. When using R910 series servo drives, shielded network cables are also required to enhance anti-interference capabilities.

7.3 EMC Standard

The R910 series servo drive executes IEC/ EN61800-3:2004 (Adjustable speed electrical power drive systems - Part 3:) The standards (EMC requirements and specific test methods) and the national standard GB/T 12668.3.

8. Simplified Commissioning Instructions

8.1 Commissioning Keypad Operation

The servo drive can perform commissioning, parameter setting or modification, and operating-status monitoring through its built-in keypad. The keypad also supports extension up to 20 meters, enabling intuitive commissioning and operation.



Figure 8-1 Introduction to Commissioning Keypad

8.2 Keypad Key Definitions

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
MOD	Parameter group switch key	Entry and exit of the first-level menu

	Increment key	Incremental data or function code
	Decrement key	Data or function code decrement
	Circular Shift Key	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, I/O line, braking resistor line and other lines to the drive. After connecting the lines, check whether the power voltage is normal, whether the motor line and encoder line correspond one-to-one, and whether the motor line phase sequence corresponds.

2 Power-on

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

3 Trial Run

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

1>Switch to the corresponding axis through the AXIS button, for example, AXIS displays 0.0, representing the drive basic parameter commissioning 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 100 rpm);

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 keypad.**

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 host 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.