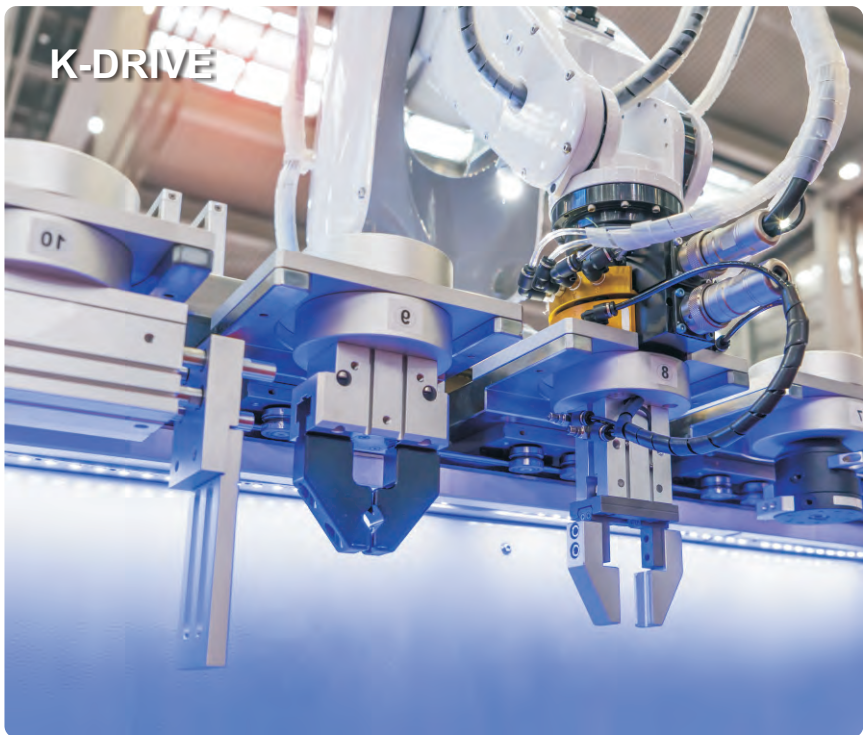


K-DRIVE



AC Servo Drive&Motor

P100S Series




User Manual




<http://www.leasyautomation.com>

Safety precautions


Before storing, installing, wiring, running, inspecting or servicing the product, the user must be familiar with and observe the following important matters to ensure the safe use of the product.

Safety signs in this manual	
 DANGER	Mishandling can cause danger and result in personal injury or death.
 NOTE	Mishandling can cause danger, personal injury or death, and damage to the equipment.
 FORBID	Behavior is strictly prohibited, as this can result in damage to or inability to use the device.

Use occasions

 DANGER
<ul style="list-style-type: none">➤ It is forbidden to expose the product to moisture, corrosive gas, and flammable gas. Otherwise, it may cause electric shock or fire.➤ It is prohibited to use the product in places where direct sunlight, dust, salt and metal powder are high.➤ It is prohibited to use products in places where water, oil and medicines are dripping.

Wiring

 DANGER
<ul style="list-style-type: none">➤ Please ground the grounding terminal reliably. Poor grounding may cause electric shock or fire.➤ Do not connect the 220V driver power supply to the 380V power supply, otherwise it will cause damage to the equipment, electric shock or fire.

 **DANGER**


- The U, V, and W motor output terminals must be connected to the motor wiring terminals U, V, and W in a one-to-one correspondence, otherwise the motor may overspeed and cause equipment damage and personal injury.
- Please tighten the power supply and motor output terminals, otherwise it may cause a fire.

Operate

 **NOTE**

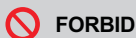
- Before the mechanical equipment starts to run, it must cooperate with the appropriate parameter settings. If it is not adjusted to the appropriate setting value, it may cause the mechanical equipment to lose control or malfunction.
- Before starting operation, please confirm whether you can start the emergency switch to stop at any time.
- Please test whether the servo motor is operating normally under no load, and then connect the load to avoid unnecessary losses.
- Do not turn on or turn off the power frequently, otherwise it will cause overheating inside the drive.

Run

 **FORBID**

- When the motor is running, it is forbidden to touch any rotating parts, otherwise it may cause casualties.
- When the equipment is running, it is forbidden to touch the drive and motor, otherwise it may cause electric shock or burns.
- When the equipment is running, it is forbidden to move the connecting cable, otherwise it may cause personal injury or equipment damage.

Maintenance and inspection



- It is forbidden to touch the inside of the drive and its motor, otherwise it may cause electric shock.
- When the power is turned on, it is forbidden to disassemble the drive panel, otherwise it may cause electric shock.
- Do not touch the wiring terminals within 5 minutes after the power is turned off, otherwise the residual high voltage may cause electric shock.
- It is forbidden to change the wiring or disassemble the servo motor when the power is turned on, otherwise it may cause electric shock.

Scope of use



- The products involved in this manual are for general industrial purposes. Do not use them on devices that may directly endanger personal safety.

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Chapter 1

Product Inspection and Installation

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1.1 Product inspection

This product has undergone a complete functional test before leaving the factory. In order to prevent the product from being abnormal due to negligence during the delivery of the product, please check the following items in detail after unpacking:

- ◇ Check that the servo driver and servo motor models are the same as the models you ordered.
- ◇ Check the servo drive and servo motor for damage and scratching during transport. Do not wire and power in case of damage during transport.
- ◇ Check the servo drive for loose parts from the servo motor. Whether there are loose screws, whether the screws are not locked or come off.
- ◇ Check that the servo motor rotor shaft rotates smoothly with your hands. Motors with brakes cannot be rotated directly.
- ◇ Check that the servo operating instructions are included.
- ◇ Check that the drive accessories are included in the box.

If there is a discrepancy in the content of the product, please contact the purchased agent.

1.2 Product front pane

This panel describes the applicable models: P100S-40, P100S-75

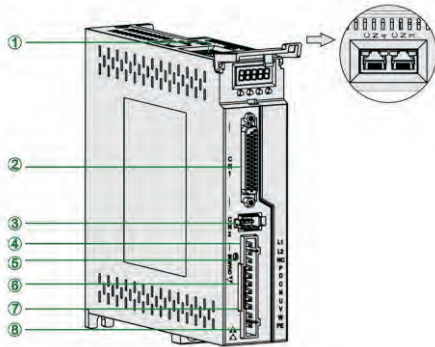


Figure 1.1 P100S Front Panel Introduction

Serial number	Terminal name	Description of the function
①	CN3, CN4	Communication terminals
②	CN1	The input and output control signal terminals
③	CN2	Encoder signal terminal
④	L1, L2	Power supply terminal
⑤	CHARGE	Bus voltage indicator. Used to indicate that the bus capacitor is charged. When the light is on, the internal capacitor of the servo unit may still be charged even if the main circuit power is switched off. Therefore, do not touch the power terminals when the light is on to avoid electric shock
⑥	P,D,C,N	Regeneration resistance terminal
⑦	U,V,W	Servo motor U, V, W connection terminal
⑧	PE	Ground terminal

1.3 Servo installation method

1.3.1 Drive installation method

✧ Installation direction

The normal mounting direction of the servo drive is vertical and upright.

✧ Fixed installation

During installation, please tighten the 2pcs M4 fixing screws at the back of the servo drive.

✧ Grounding

Be sure to ground the driver grounding terminal, otherwise there may be a risk of electric shock or interference to produce wrong action.

✧ Wiring requirement

When connecting the drive, please wire the cable down (refer to the below picture) to avoid any liquid attached on the cable and then it flows into the drive along with the cable.

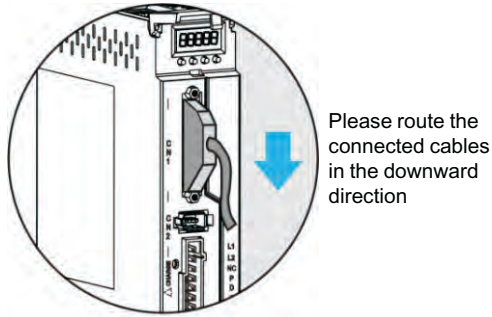


Figure 1.2 Wring Direction Requirement

◇ **Installation interval**

Refer to pic 1.3 for the distance between drives and installation intervals with other devices, and please note that the picture indicates the smallest size, in order to ensure the performance and life of the drives, please leave the full installation interval as far as possible.

◇ **Cooling**

The servo drive adopts natural cooling mode and forced heat dissipation mode.

◇ **Installation considerations**

Prevent dust or iron chips from entering the servo drive when installing the electrical controlling cabinet.

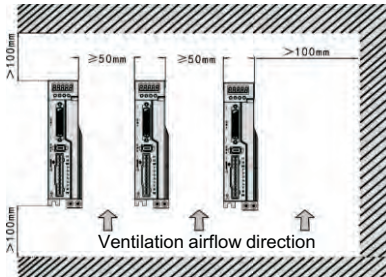


Figure 1.3 Installation interval

1.3.2 Environment Condition For Installation

Since the environment conditions for servo driver installation have the direct influence to the normal function and service life of the servo driver, therefore the environment conditions must be conformed to the following conditions:

- ◇ Ambient temperature: 0 to 40°C; Ambient humidity: less than 80% (no condense).
- ◇ Storage temperature: -40 to 50°C; Storage humidity: less than 93% (no condense).
- ◇ Vibration: less than 0.5G.
- ◇ Preventive measure shall be taken against raindrop or moist environment.
- ◇ Avoid direct sunlight.
- ◇ Preventive measure shall be taken against corrosion by oil mist and salinity.
- ◇ Keep away from radioactive and inflammable substances.
- ◇ Free from corrosive liquid and gas.

1.3.3 Servo Motor Installation

- ◇ For horizontal installation : In order to prevent water, oil, etc. from entering inside of the servo motor, please put the cable connector downward.
- ◇ For vertical installation: if the shaft of the servo motor is in upward direction with a speed reducer, some prevention measure shall be taken against entering inside of the servo motor by oil come from the speed reducer.
- ◇ In case of installation or removing the servomotor, please do not hit the servo motor with a hammer, otherwise the shaft and the encoder can be damaged.

1.3.4 Motor Rotation Direction Definition

The motor rotating direction description in this handbook is defined as facing the shaft of the servo motor, if the rotating shaft is in counterclockwise direction will be called as positive direction, or in clockwise as reversal direction.

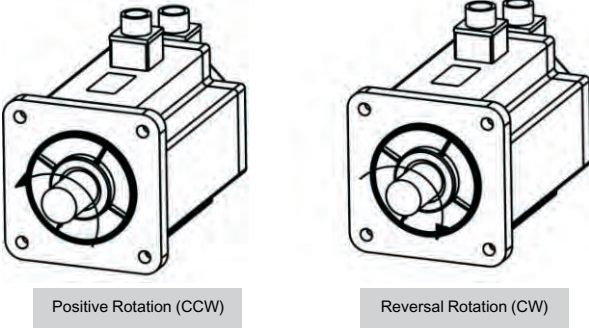
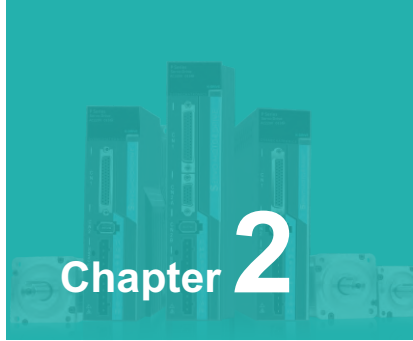


Figure 1.4 Motor Rotation Direction



Chapter 2

Servo Specifications

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2.1 Servo Drive Specification

Model	P100S-40	P100S-75
Power	0.05KW~0.4KW	0.75KW~1KW
Main Circuit	Single AC220V-15%~+10% 50/60Hz	
Way to control	0: Position; 1: Speed; 2: Torque; 3: Position and speed; 4: Position and torque; 5: Speed and torque.	
Protective Function	Over speed, Over voltage, Under voltage, Overload, Abnormal of main power, Abnormal encoder, Out of position error etc.	
Monitor Function	Speed, Current position, Command pulse accumulation, Position deviation, Motor torque, Motor current, Running state etc.	
Control Input	1: Servo on 2: Alarm clearance 3: CCW drive inhibition 4: CW drive inhibition 5: Deviation counter clearance 6: Command pulse inhibition 7: CCW torque limit 8: CW torque limit	
Control Output	Servo ready/Servo alarm/Positioning completion/Mechanical braking	
Regeneration Braking	Built-in/ Built-out	
Load	Less than 3 times of motor torque	
Display	5 LED digital display and 4 keys	
Communication	Rs485	
Position Control Mode	Input Mode	0: pulse + direction
		1: CCW/CW pulse
		2: A/B two-phase quadrature pulse
		3: Internal position control
Electronic gear ratio	Gear ratio molecules: 1-32767	
	Gear score mother: 1-32767	

2.2 Servo Drive Naming Rule

P 100 S - 40 - $\square\square\square$
 $\text{\textcircled{1}}$ $\text{\textcircled{2}}$ $\text{\textcircled{3}}$ $\text{\textcircled{4}}$ $\text{\textcircled{5}}$

Servo drive naming rules	Serial Number	Meaning
	$\text{\textcircled{1}}$	P-Series servo drives
	$\text{\textcircled{2}}$	Power,100: 0.05KW~1KW; 200:1KW~2KW
	$\text{\textcircled{3}}$	S: Simple function type H: Full function type
	$\text{\textcircled{4}}$	The branch power range below 1KW: 40: 0.05KW~0.4KW; 75:0.4KW~0.75KW
	$\text{\textcircled{5}}$	Customization

2.3 Servo Motor Naming Rule

DB 80 - 024 30 A6 - TJA B
 $\text{\textcircled{1}}$ $\text{\textcircled{2}}$ $\text{\textcircled{3}}$ $\text{\textcircled{4}}$ $\text{\textcircled{5}}$ $\text{\textcircled{6}}$ $\text{\textcircled{7}}$

Servo motor naming rules	Serial No.	Definition
	$\text{\textcircled{1}}$	DB: 5 pair poles ac servo motor
	$\text{\textcircled{2}}$	Flange: 40(mm),60(mm),80(mm),90(mm),110(mm),130(mm)
	$\text{\textcircled{3}}$	Rated torque($\times 0.1\text{N.m}$): 048=4.8N.m
	$\text{\textcircled{4}}$	Rated speed($\times 100\text{rpm}$): 30=3000rpm
	$\text{\textcircled{5}}$	Encoder resolution: A6=17-bit single turn absolute
	$\text{\textcircled{6}}$	TJA: AMP connector
	$\text{\textcircled{7}}$	B: with a brake, Null: without a brake

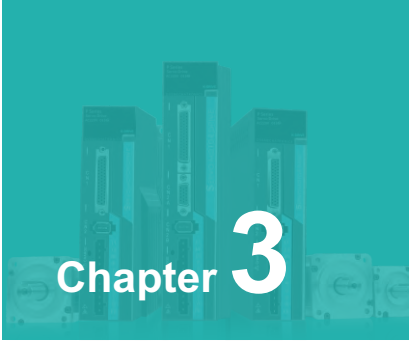
NOTE:

The code 02430 means the motor rated torque is 2.4N.m and rated speed is 3000rpm.

The rated power: $P=0.1047 \times N \times T=0.1047 \times 2.4 \times 3000=753.84\text{W} \approx 0.75\text{KW}$. T=rated torque, N=rated speed.

2.4 Servo Motor And Matched Servo Drive List

Motor	Model	Power (W)	Speed (rpm)	Matched Drive	Encoder
40mm	DB40-00330A1-TJA(B)	100	3000	P100S-40	17-bit single turn absolute encoder
60mm	DB60-00630A6-TJAB)	200	3000		
	DB60-01330A6-TJA(B)	400	3000		
80mm	DB80-02430A6-TJA(B)	750	3000	P100S-75	
	DB80-03230A6-TJA(B)	1000	3000		



Chapter 3

Drive And Motor Dimension

- 3.1 Drive Dimension.....18
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3.1 Drive Dimension

The user can install the servo drive with the bottom plate and the installed direction is perpendicular to the installation facing. Recommended to cool the servo drive with fan or natural cooling.

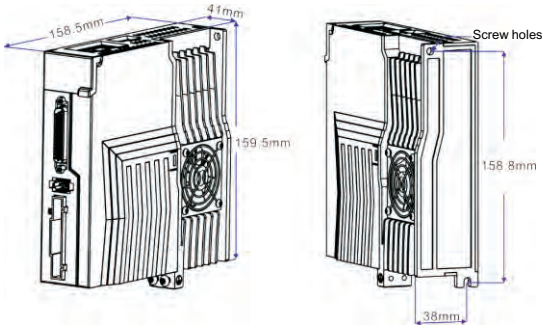


Figure 3.1 P100S-40/P100S-75 Dimension

NOTE:

P100S-40 doesn't have the heat sink with a fan.

3.2 Motor Dimension

◇ Flange 40mm

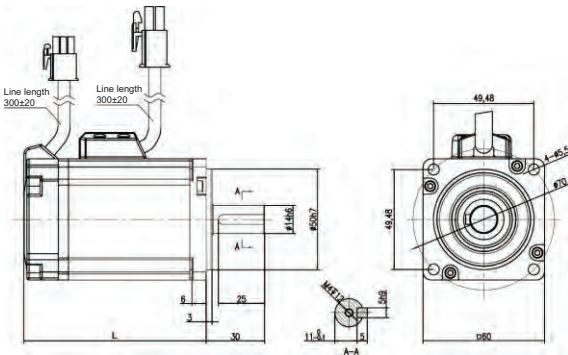


Figure 3.2 Flange 60mm And Table 3-1

Model	DB40-00330A6-TJA
L (mm)	93

◇ Flange 60mm

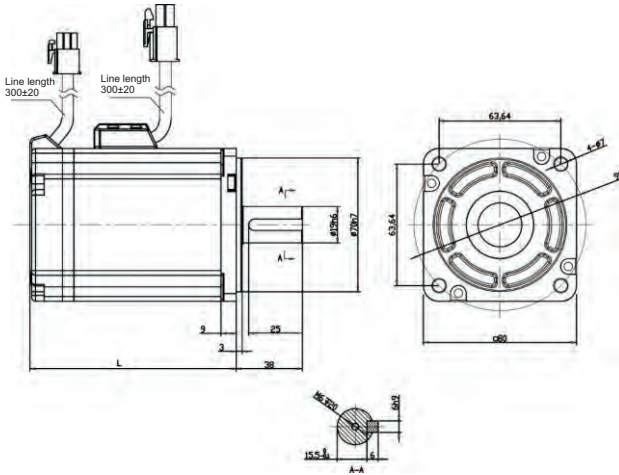


Figure 3.3 80 Flange 60mm And Table 3-2

Model	DB60-00630A6-TJA	DB60-01330A6-TJA
L (mm)	72	90



Chapter 4

Drive System wiring and Introduction

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4.1 Servo system wiring

4.1.1 Servo driver wiring diagram

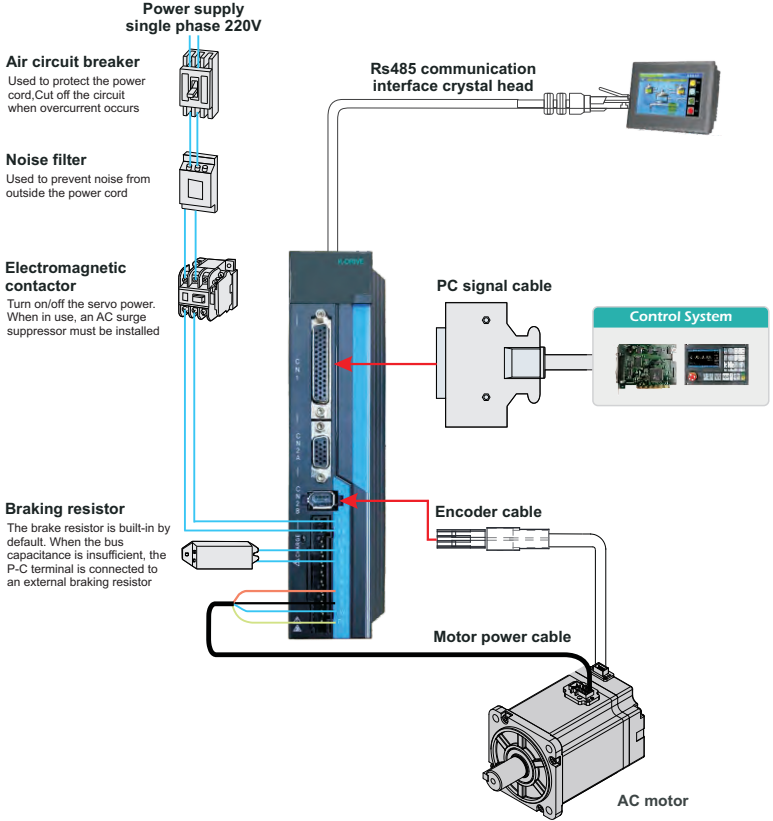



Figure 4.1 Servo system wiring

4.1.2 Wiring Introduction

Wiring Notes:

- ✧ The control cable length should be less than 3 meters and the encoder cable length 20 meters.
- ✧ Check that the power supply and wiring of L1,L2 are correct.
- ✧ Please do not connect to 380V power supply.
- ✧ The output terminals(U,V,W) must be connected with the servo motor connections(U,V,W) correspondently, otherwise the servo motor will stop or over speed. However, by exchanging three-phase terminal cannot cause the motor to reverse; this point is different with asynchronous motor.
- ✧ Earthed wiring must be reliable with a single-point connection.
- ✧ Pay attention to the correct direction of freewheel diode which is connected with the delay at the output terminal, other can cause the output circuit breakdown.
- ✧ In order to protect the servo driver from noise interference that can cause malfunction, please use an insulation transformer and noise filter on the power lines.
- ✧ Wiring the power cables(power supply , main circuit ,etc) at a distance over 30cm away from the control signal cables, do not lay them together.
- ✧ Install a non-fuse circuit breaker that can shut off the external power supply immediately for in case of the servo driver fault.

4.1.3 Electric Wire Specifications

Connection Terminal	Symbol	Wire Specifications
Main Power Supply	L1、 L2	1.5~4mm ²
Servo Motor	U、 V、 W	1.5~4mm ²
Ground		1.5~4mm ²
Control Signals	CN1	≥0.14mm ² (AWG26),Shielded.
Encoder Signals	CN2	
Regenerative Resistors Terminals	P、 D/P、 C	1.5~4mm ²

NOTE:

Must use a twisted pair wire cable for the encoder signal wiring. If the encoder signal cable is too long (> 20m), in which the encoder power supply can be insufficient, may use multi wires or thick wire for the power supply wiring.

4.2 Servo driver terminals Introduction

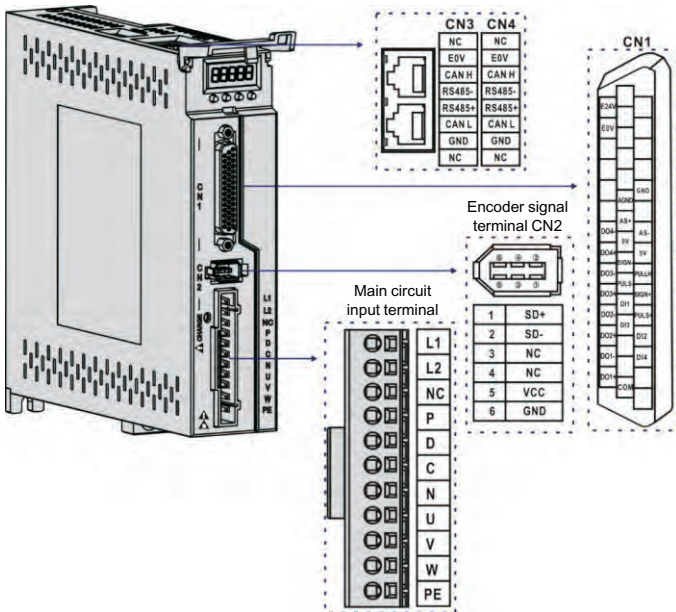


Figure 4.2 P100S Drive Terminals

NOTE:

The above picture shows the pins arrangement of the drive.

4.3 Main Circuit Terminal

4.3.1 Main Circuit Terminal Introduction

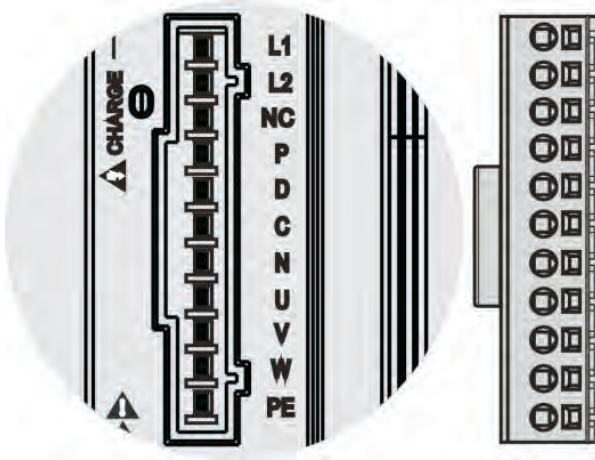


Figure 4.3 Main Circuit Terminal

Name	Terminal symbol	Detailed description
Main Power Supply	L1、L2	Connect to external AC power supply ,1 phase 220VAC - 15%~+10%, 50/60Hz.
	NC	Null
Regenerative Resistance	P、D	When use the built-in resistor,please connect P and D.
	CN1	When the external regeneration resistance is required, please disconnect P and D and crossover it to terminal P and C. Leaving N disconnected.
Servo Motor	U、V、W	U、V、W phase output to servo motor.
	⊕	Ground with servo motor and power supply

NOTE:

The built-in resistor has been set as default by factory: P and D connector are in short-cut condition.

4.3.2 Regeneration Resistance Connection

If use the built-in resistor, please connect P and D (a 4 pins connector for built-in resistor has been set by factory, so you can insert it to the terminal directly), as picture A showed.

When an external regeneration resistance is connected to the servo drive, the short circuit between terminal P and D must be disconnected. Then the external regeneration resistance could be connected between P and C, and leave N alone, as picture B showed.

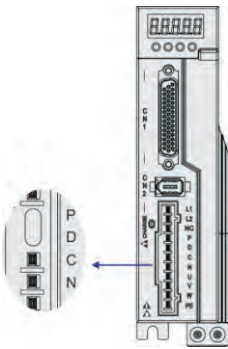


Figure A

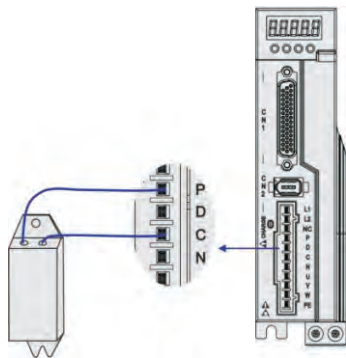


Figure B

NOTE:

Precautions for braking resistor wiring:

- Do not connect the external brake resistance to the positive and negative poles of the bus P、N, otherwise it will cause explosion and fire.
- Must be over minimum resistance value at 25Ω. Otherwise it would cause drive alarm or damage.
- Please install external brake resistance on non-combustible materials such as metal.

4.4 CN1 control signal terminal

4.4.1 CN1 Terminal Introduction

The CN1 connector DB44 plug provides the signals interfaced with the host-controller. The signal includes:

- ◇ 4 programmable input terminals;
- ◇ 4 programmable output terminals;
- ◇ Analog command inputs;
- ◇ Pulse command inputs.

4.4.2 CN1 terminal pin distribution

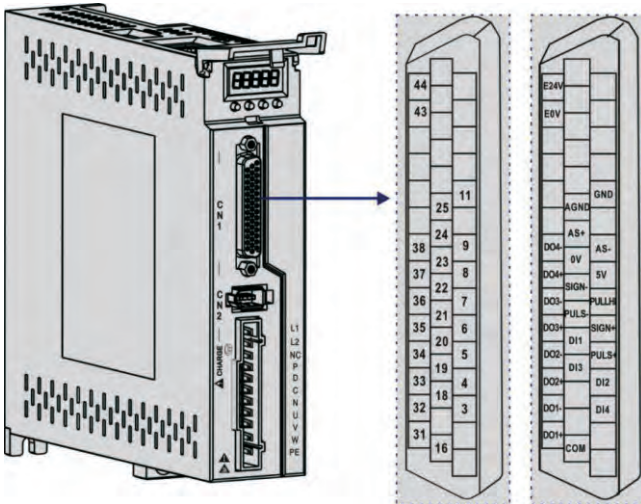
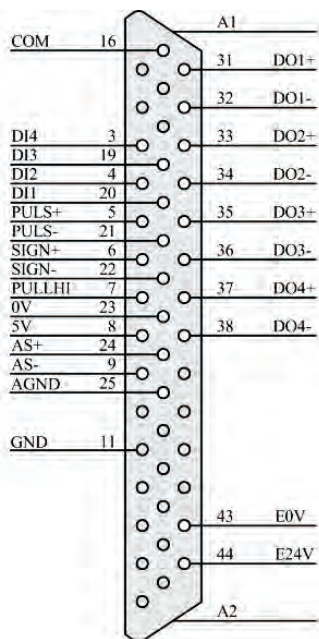


Figure 4.4 CN1 Terminal Pin Distribution

NOTE:

24-26 AWG cable is recommended.



Pin	NAME	Function
16	COM	Digital input signal common
3	DI4	Digital input 4
19	DI3	Digital input 3
4	DI2	Digital input 2
20	DI1	Digital input 1
5	PULS+	Command pulse input
21	PULS-	
6	SIGN+	Addition of command pulse
22	SIGN-	
7	PULLHI	24V power input interface
23	0V	
8	5V	Internal 5V power output
24	AS+	Analog speed/torque command input
9	AS-	
25	AGND	Analog signal ground
11	GND	Internal digital signal
31	DO1+	Digital output 1
32	DO1-	
33	DO2+	Digital output 2
34	DO2-	
35	DO3+	Digital output 3
36	DO3-	
37	DO4+	Digital output 4
38	DO4-	
43	E0V	Internally isolated 24V power output
44	E24V	
A1		Metal shell grounding
A2		

4.4.3 Position Instruction Input Signal

Signal name	Pin No.	Function
Position pulse instruction	PULS+	5
	PULS-	21
	SIGN+	6
	SIGN-	22
	PULLHI	7
	GND	11

The command pulse output circuit on the host device side can be selected from two types of differential driver output or open collector output. The maximum input frequency and minimum pulse width are shown in the following table:

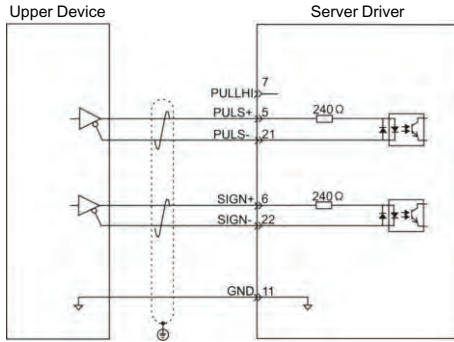
Pulse mode	Maximum frequency (pps)	Minimum pulse width (us)
Difference output	500K	1
Open collector	200K	2.5

NOTE:

- If the output pulse width of the upper device is less than the minimum pulse width value, the driver will receive the pulse incorrectly.
- The ports between PULS plus and PULS-and between SIGN and SIGNAL only support signal level inputs below 5V, and more than 5V signals must be threaded with external resistors or the driver will be damaged.

Input Circuit Of Pulse Instruction Diagram

❶ When it is the differential mode:

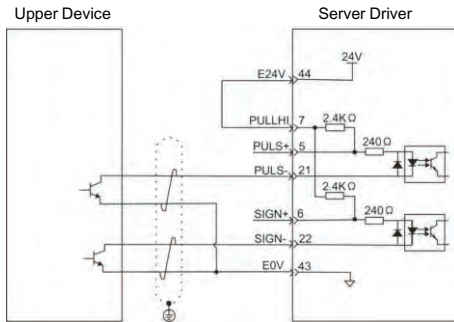


Chapter 4

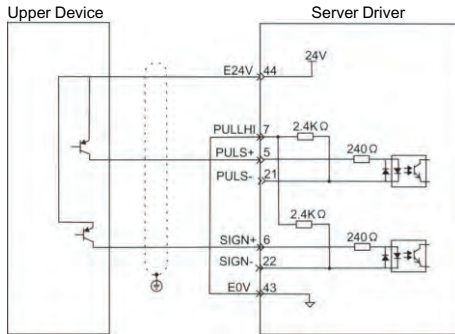
❷ When it is collector open mode:

A) When using the Servo drive's internal 24V power supply:

❖ Common anode connection method, such as: Mitsubishi PLC.



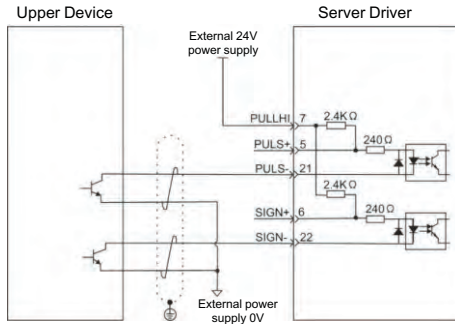
◇ Common cathode connection method: For example: Siemens PLC.



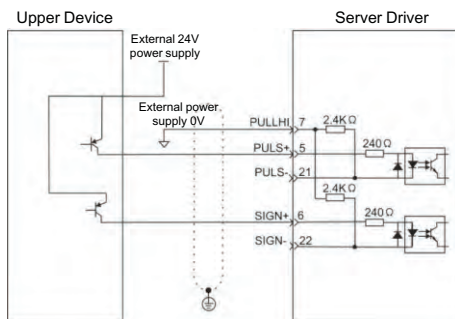
B) When using an external power supply:

Scenario 1: Use the drive internal resistance (recommended)

◇ Common anode connection:

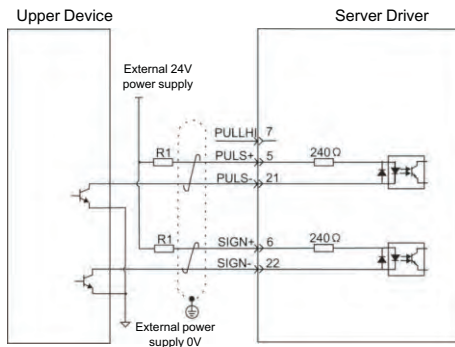


❖ Common cathode connection method:

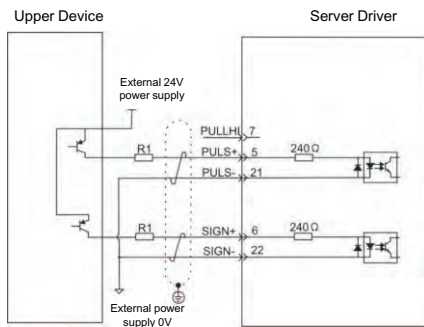


Scenario 2: Use the driver's external resistance.

❖ Common anode connection:



◇ Common cathode connection method:



NOTE:

Selection formula for resistance R1:

$$\frac{VCC-1.5}{R1+240} = 10mA$$

VCC Voltage	R1 Resistance	R1 Power
24V	2.4KΩ	0.5W
12V	1.5KΩ	0.5W

4.4.4 Digital Quantity Input And Output Signal

Signal name	Pin number	Default function	Illustrate	
Digit input	DI1	20	Servo enablement	Optocoupler input and function can be programmable. Defined by parameter P3 group(P3-0~P3-17). The input voltage of COM is both of common positive and negative terminal. And input signal voltage is 12~24V. In position mode (internal position mode) and non-position mode ,please connect 24 V to pin 7, DI5 to pin21, DI6 to pin 22. Or to connect 0 V to pin7, DI5 to 5 pin ,DI6 to pin 6.
	DI2	4	Alarm cleared	
	DI3	19	Forward drive prohibited	
	DI4	3	Reverse drive prohibited	
	PULS-	21	In position mode (internal position mode) and non-position mode	
	SIGN-	22		
	PULS+	5		
	SIGN+	6		
	PULLHI	7		
COM	16	Common end of digital input signals		

Signal name		Pin number	Default function	Illustrate
Digit output	DO1+	31	Z signal output	Photo isolation output.Function can be programmable. Defined by parameter P3 group (P3-20~P3-23). Remark: When PA104=1, the differential output can be programmed by P3-24.
	DO1-	32		
	DO2+	33	Alarm output	
	DO2-	34		
	DO3+	35	Positioning completed	
	DO3-	36		
	DO4+	37	Magnetic brake	
	DO4-	38		
	DO5+/RSA	26	Z signal differential output	
DO5-/RSB	10			
Internal isolated power output	0V	23	Internal 0V	Internal 5V power output and the max output current 200mA.
	5V	8	Internal 5V	
	E0V	43	Internal 0V	Internal isolated 24V power output and the voltage range is 20V~28V and max output current 100mA.
	E24V	44	Internal 24V	

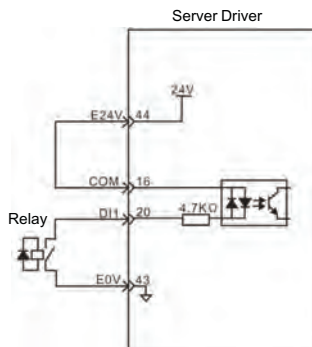
Schematic diagram of digital input circuit

For DI1 as an example(the DI1~DI4 interface circuit is the same) :

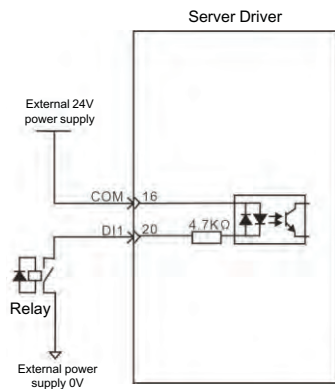
① When the upper device is relay output :

A) When using the Servo drive's internal 24V power supply

◇ When using the Servo drive's internal 24V power supply:

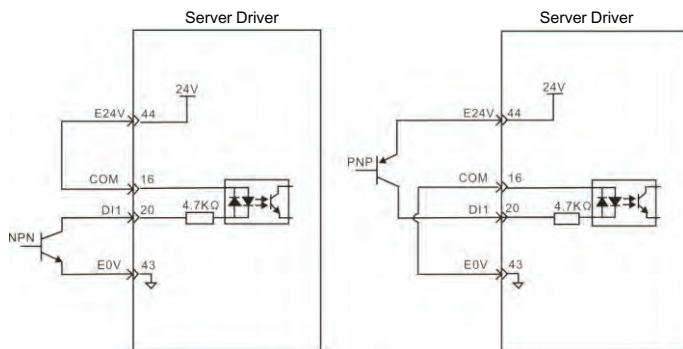


B) When using external 24V power supply:



② When the upper unit is an open output of the collector

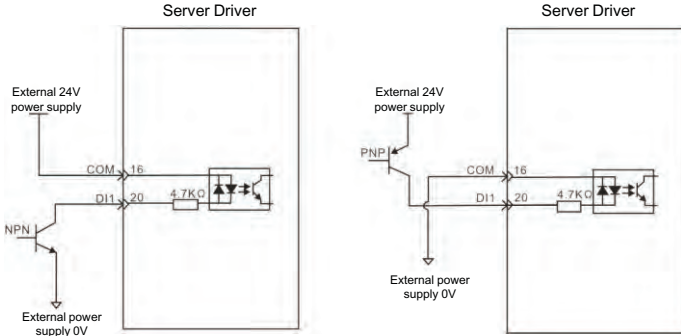
A) When using the internal 24V power supply of the servo drive:



NOTE:

➤ Do not support PNP mixed with NPN input.

B) When using external 24V power supply:



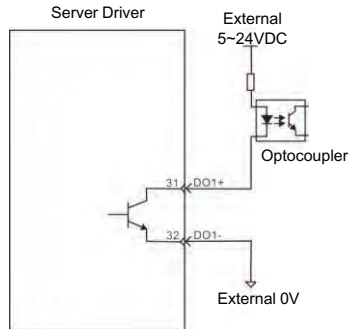
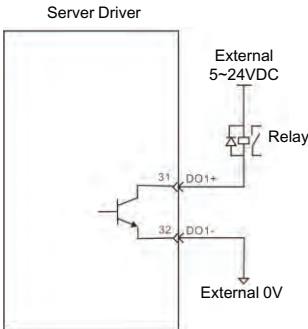
NOTE:

- Mixing PNP with NPN input is not supported.

Digital output circuit diagram

Take DO1 as an example, the DO1-DO4 interface circuit is the same.

- 1 When the upper unit is a relay input:
- 2 When the upper unit is a relay input:



NOTE:

When the upper device is a relay, be sure to connect the freewheeling diode, otherwise it may damage the DO port or cause strong signal interference.

The maximum allowable voltage and current capacity of the optocoupler output circuit inside the servo drive are as follows:

- Voltage: DC30V
- Current: DC50mA

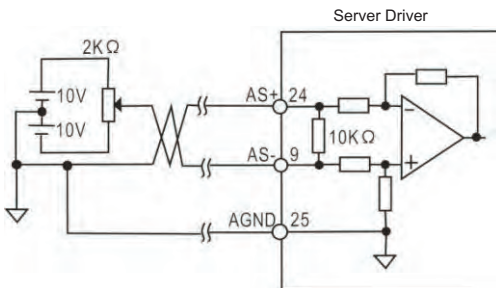
4.4.5 Analog instruction signal

Signal name	Pin number	Default function
Analog Instruction Input	AS+, AT+	24
	AS-, AT-	9
	AGND	25
		Analog velocity/torque input, range: -10V~+10V

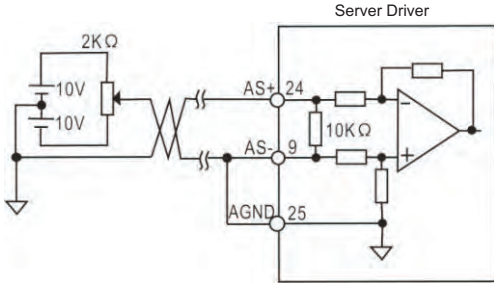
Pulse Instruction Input Interface Diagram

There are two kinds of connections, differential input and single-ended input, and differential input join is recommended. Speed and torque share an analog input, input range: -10V to 10V, input impedance of about 10K. It is normal for analog inputs to have zero bias and can be compensated by parameters.

- ❶ When it is analog differential input:



② When it is analog single-end input:



4.4.6 Motor Brake Connection

The lock is a mechanism that prevents the servo motor shaft from moving while the servo drive is not running, keeping the motor locked in position so that the moving part of the machine does not move due to self-weight or external forces.

Brake Signal Circuit Diagram

The connection of the lock terminal input signal is not polar and requires the user to prepare a 24V power supply. The standard wire examples of the lock signal BK and the lock power supply are as follows:

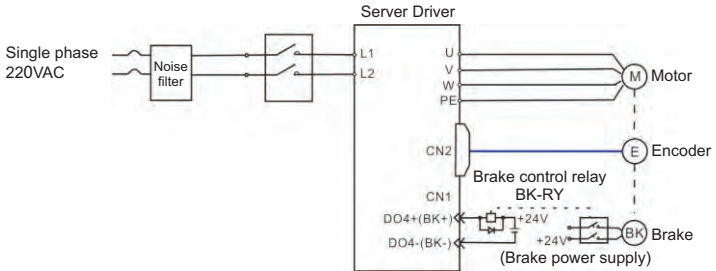


Figure 4.6 Brake Signal Connection

NOTE:

- The lock mechanism built into the servo motor is a fixed special mechanism of non-energized action type and is not used for braking purposes and only when the servo motor is kept stopped.
- The lock coil is non-polar.
- After the servo motor is stopped, the servo on signal (Servo On) should be cut off.
- When the motor with the built-in lock is running, the lock may click without functional effect.
- Flux leakage may occur at the shaft end and other areas when the lock coil is energized (the lock is open). Be aware when using instruments such as magnetic sensors in motor accessories.
- The lock is prohibited from sharing power supply with other electrical appliances to prevent voltage or current reduction due to the work of other electrical appliances, which ultimately causes the wrong action of the lock.
- Cables above 0.5mm² are recommended.

4.5 CN2 Encoder Signal Terminal**4.5.1 CN2 Terminal Introduction**

The encoder signal connector CN2 connects with the servo motor encoder. A 6 pins plug is used. The pin chart is:

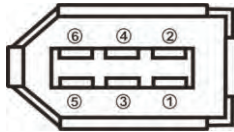


Figure 4.7 CN2 Encoder Signal Terminal

4.5.2 CN2 Signal Introduction

Signal name	Pin number	Default function
Encoder signal power supply	5V	Encoder with a 5V power supply (provided by the driver), cables above 20m, in order to prevent the encoder voltage reduction, the power supply and ground wire can be multi-wire connection or use thick wires.
	0V	

Signal name	Pin number	Default function	
Absolute encoder communication positive terminal	SD+	1	Absolute encoder communication positive terminal
Absolute encoder communication negative terminal	SD-	2	Absolute encoder communication negative terminal
Empty end	NC	3	retain
Empty end	NC	4	retain
Shielded layer	Metal cover		Connect to the shielded layer of the encoder cable

4.6 CN3 And CN4 Terminal Definition

4.6.1 Communication Terminal Wiring Diagram

CN2 encoder signal terminal and motor encoder connection diagram.

The terminals of the encoder use a 6PIN socket with a pin distribution of:

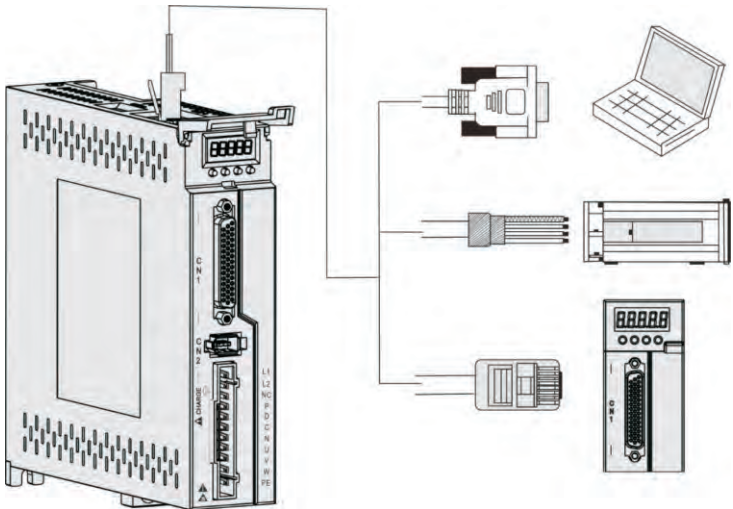
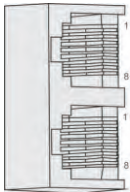


Figure 4.8 Communication Terminal Wiring

4.6.2 Communication port definition

Pin Number	CN3	Name	CN4	Name	Lcon
1	NC	Empty end	NC	Empty end	
2	E0V	CAN signal ground	E0V	CAN signal ground	
3	CAN H	CAN bus interface	CAN H	CAN bus interface	
4	Rs485 -	Rs485 Communications interface	Rs485 -	Rs485 Communications interface	
5	Rs485+		Rs485+		
6	CAN L	CAN bus interface	CAN L	CAN bus interface	
7	GND	485 signal ground	GND	485 signal ground	
8	NC	Empty end	NC	Empty end	

The CN3 and CN4 ports on the drive allow the drive to communicate with the PC, PLC, and drive, where the port pins for CN3 and CN4 are defined as follows:

NOTE:

- The PC or upper computer controls can be connected via a dedicated serial cable, which is not plugged in and out.
- Twisted pair or shielded wire is recommended, the length of the wire is less than 2 meters.
- When multi-machine series, the CN3 is connected to the first-stage drive CN4 and the CN4 is connected to the first-stage driveN3.
- When using RS485 bus communication, when the upper machine's 485 signal is connected to the earth (PE), connect the upper machine PE terminal to the driver terminal by reasonable grounding, in which case the upper machine 485 signal ground is not allowed to be connected to the driver 485 signal ground (GND), otherwise the driver may be damaged.

4.6.3 RS485 Communication Connection Introduction

① Connection With RS485 of A PLC

A connection cable between the driver and the PLC is as follows:



Figure 4.9 The Communication Cable Of Servo Drive With PLC

Table 4-2 Servo drive and PLC communication cable pin connection relationship

Drive side RJ45 (A-side)		PLC side (B-side)	
Signal name	Pin number	Signal name	Pin number
Rs485+	4	Rs485+	4
Rs485-	5	Rs485-	5
GND	7	GND	7
PE (Shielding layer)	Cover	PE (Shielding layer)	Cover

② RS485 Communication Parallel Connection Of Multi Drives

When using 485 communication network, the parallel connection of multi drives is as follows:



Figure 4.10 Parallel Cable Diagram Of Multi Drives

Table 4-3 Connection Between Multi Drives

Drive side RJ45 (A-side)		PLC side (B-side)	
Signal name	Pin number	Signal name	Pin number
Rs485+	4	Rs485+	4
Rs485-	5	Rs485-	5
GND	7	GND	7
PE (Shielding layer)	Cover	PE (Shielding layer)	Cover

③ RS485 Communication Grounding Precaution

When using RS485 communication, the GND terminal of the upper device is connected with the GND terminal of the servo drive as shown in the following picture:

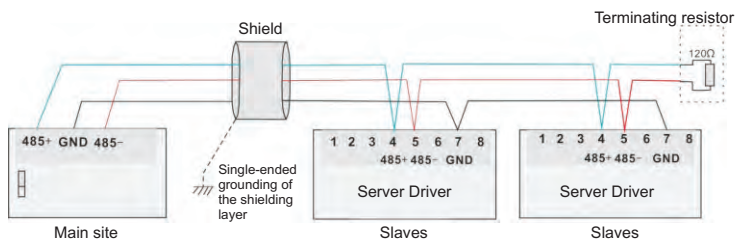


Figure 4.11 485 Communication Connection Diagram

When using RS485 communication, the signal ground of the upper device is connected to the ground as shown in the figure below:

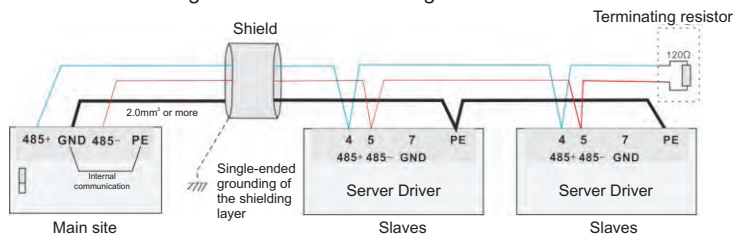


Figure 4.12 485 host computer communication connection diagram

NOTE:

- The PLC has a built-in 485 communication terminal resistor.
- It is recommended that the shield be single-ended grounding.
- Do not connect the GND terminal of the upper unit to the Servo driver E0V terminal, as this will damage the machine.

4.7 Anti-jamming countermeasures for power wiring

To suppress interference, please take the following measures:

- ❖ The instruction input cable length should be below 3m and the encoder cable should be below 20m.
- ❖ Use thick wiring whenever possible for ground wiring. (2.0mm² or more)

- ✧ Use a noise filter to prevent RF interference. When used in civilian environments or in environments with high power interference, install a noise filter on the input side of the power cord.
- ✧ To prevent incorrect actions caused by electromagnetic interference, the following methods can be used:
 - ❶ Install the upper unit and the noise filter near the servo drive whenever possible.
 - ❷ Install the surge suppressor on the coils of relays, solenoids, and electromagnetic contactors.
 - ❸ Separate the strong line from the weak line when wiring and maintain a distance of more than 30cm. Do not put in the same pipe or tie them together.
 - ❹ Do not share power supplies with welding machines, discharge processing devices, etc. When a high frequency generator is nearby, install a noise filter on the input side of the power cord.

4.7.1 Wiring Examples Of Anti-Jamming And Ground Handling

4.7.1.1 Examples of anti-jamming wiring

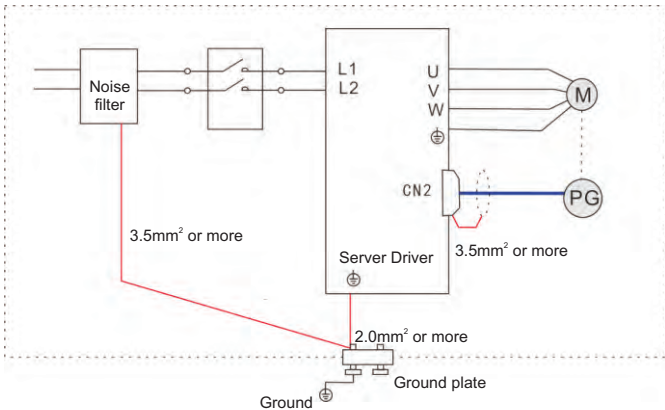


Figure 4.12 Example Of Anti-Jamming Wiring

NOTE:

- The outer box cable for grounding uses more than 3.5mm² thick wire whenever possible, and braided copper wire is recommended.
- When using the noise filter, observe the precautions described in the Noise Filter Usage Methods below.

4.7.1.2 Ground handling

To avoid possible electromagnetic interference problems, please ground it as follows.

❶ Grounding of the servo motor housing

Please connect the grounding terminal of the servo motor and the grounding terminal PE of the servo drive together, and connect the PE terminal to the ground reliably to reduce potential electromagnetic interference problems.

❷ The shielding layer of the encoder cable is grounded

Please ground both ends of the shielding layer of the motor encoder cable.

4.7.2 How To Use A Noise Filter

To prevent interference from the power cord and to reduce the impact of servo drivers on other sensitive devices, select the appropriate noise filter at the power input, depending on the size of the input current. Also, install the noise filter at the power cord of the peripheral unit as needed. When installing and wiring noise filters, observe the following precautions so as not to impair the actual use of the filter.

- ❶ Please separate the noise filter input and output wiring, do not put the two in the same pipe or bundle them together.

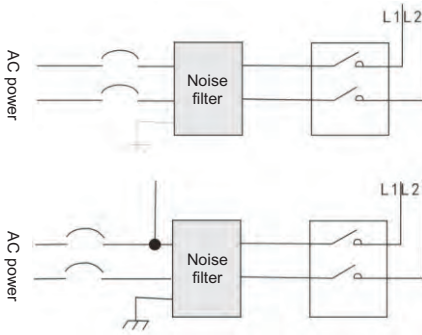


Figure 4.13 Example diagram of separate wiring of noise filter input and output wiring

- 2 Separate the ground wire of the noise filter from its output power wire.

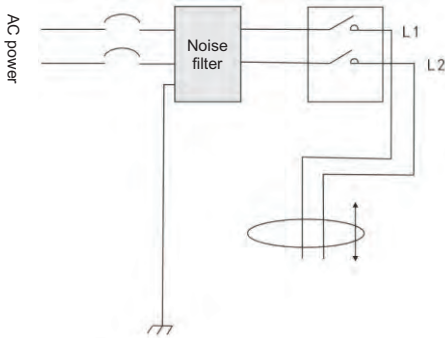


Figure 4.14 Schematic diagram of separate wiring of noise filter ground wire and output wiring

- 3 Noise filters should be grounded separately using as short a thick wire as possible, and do not share a ground wire with other grounding equipment.

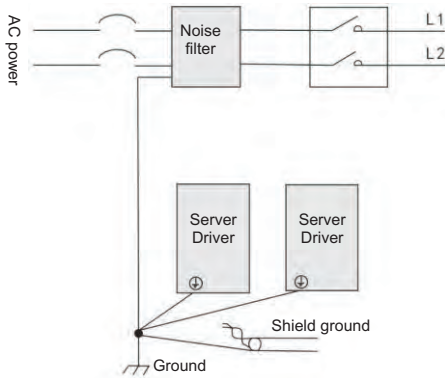


Figure 4.15 Schematic diagram of single point grounding

④ Ground wire treatment of the noise filter installed in the control cabinet.

When the noise filter is installed in the same control cabinet as the servo driver, it is recommended that the filter be secured to the servo drive on the same metal plate to ensure that the contact part is conductive and well connected, and that the metal plate is grounded.

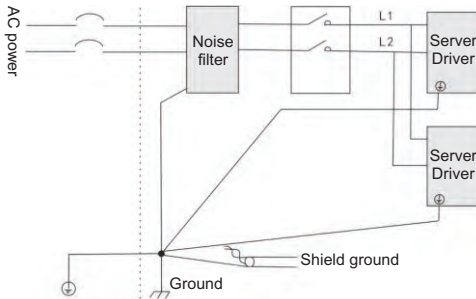


Figure 4.16 Noise filter ground processing schematic



Chapter 5

Running Mode and Control Wiring Chart

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5.2 Speed Control Mode Wiring.....	56
5.3 Torque Control Mode.....	59
5.4 Origin Regression Function And Relevant Parameters Introduction.....	61
5.5 Pre-operational Inspection.....	64

According to the command mode and operation characteristics of servo drive, there are three modes of operation: position control operation mode, speed control operation mode and torque control operation mode.

- ✧ Position control mode generally determines the displacement of movement by the number of pulses, and the pulse frequency of the external input determines the size of the rotation speed. Because the position mode can be strictly controlled for position and speed, it is generally used in positioning devices. Servo is the most widely used control mode, mainly used in robots, patch machines, milling engraving, CNC machine tools.
- ✧ Speed control mode is used in some constant speed situations by simulating a given amount, a digital quantity given, and communicating a given control rotation speed. For example, the milling machine application, the upper machine uses the position control mode, the servo driver adopts the speed control mode.
- ✧ The torque control mode is given by analog quantity, given by digital quantity, and by communication given by controlling torque size. Mainly used in the material force has strict requirements for winding and rolling devices, such as winding devices or pull fiber optic equipment and other tension control situations, torque settings should be changed at any time according to the radius of winding, to ensure that the material's force does not change with the winding radius.

5.1 Position control mode

5.1.1 Position Mode Introduction

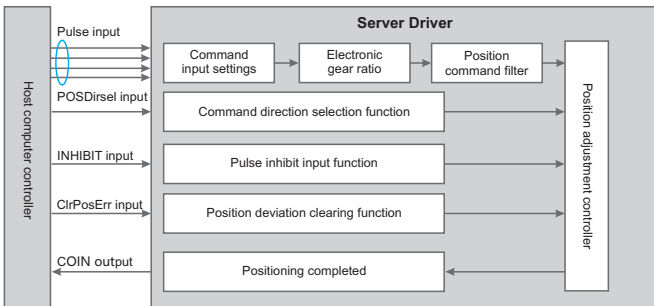


Figure 5.1 Position control mode block diagram

Location mode is a common operating mode for servo drives, and its main use steps are as follows:

- ✧ Correctly connect the power supply of the servo main circuit and control circuit, as well as the motor power line and encoder line. After power-on, the servo panel displays "r 0", which means that the servo power supply and encoder wiring are correct.
- ✧ Carry out servo JOG test run by pressing the key to confirm whether the motor can run normally.
- ✧ Refer to Figure 5.2 for wiring instructions to connect the pulse direction input and pulse command input in the CN1 terminal, as well as the required DI/DO signals, such as servo enable, alarm clear, positioning completion signal, etc.
- ✧ Carry out position mode related settings. Set the DI/DO used according to the actual situation.
- ✧ Servo enable, control the rotation of the servo motor through the position command issued by the upper computer. First, make the motor rotate at a low speed, and confirm whether the direction of rotation and the electronic gear ratio are normal, and then adjust the gain.

5.1.2 Position mode wiring

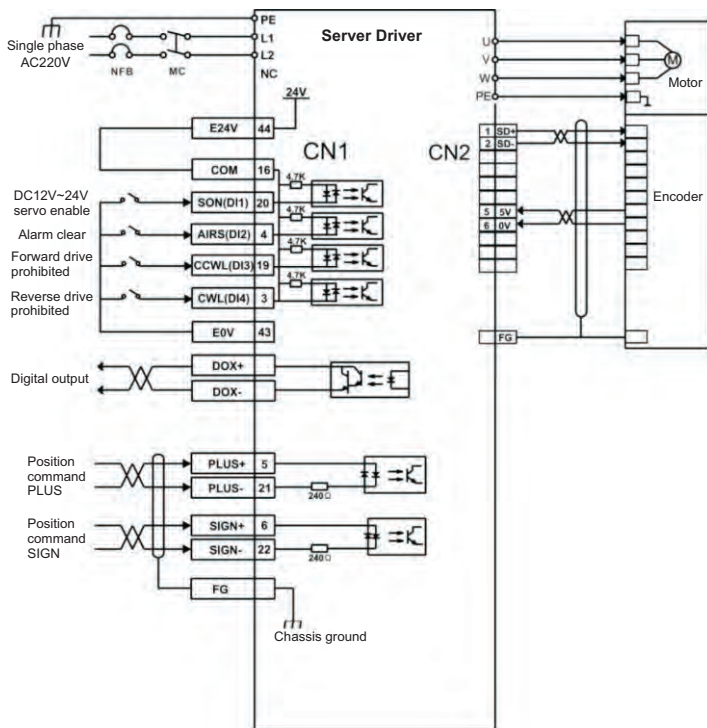


Figure 5.2 Position mode wiring diagram

NOTE:

- The internal supply voltage range is 20V to 28V, with a maximum operating current of 100mA. If you are using an external 24V power supply, connect the external power supply to pin 16 (COM) and the external power supply 0V to pin 43 (E0V).
- DO output power users need to bring their own, power range 5V to 24V. The DO port has a maximum allowable voltage dc30V and a maximum allowable current of 50mA.

5.1.3 Parameter Settings In Position Mode

5.1.3.1 Gain And Smooth Filter

Necessary parameters	Parameter Description	Parameter value	Factory default
PA4	Control method selection	0	0
PA9	Position proportional gain	1-1000	80
PA19	Position command smoothing filter	0-1000×0.1ms	100
PA100	Command filter selection	0-1	0

5.1.3.2 Digital Input

Necessary parameters	Parameter Description	Parameter value	Factory default
PA11	Command pulses for each rotation	0-30000	10000
PA12	1st numerator of electronic gear for position command pulse	1-32767	0
PA13	Denominator of electronic gear for position command pulse	1-32767	10000
PA14	Input mode of position command pulse	0-3	0
PA15	reverse direction of position command pulse	0-1	0
PA59	The effective edge of command pulse	0-1	0
PA77	2 nd numerator of electronic gear for position pulse	1-32767	0
PA78	3 rd numerator of electronic gear for position pulse	1-32767	0
PA79	4 th numerator of electronic gear for position pulse	1-32767	0
PA80	Effective level of command direction signal	0-1	0
PA81	Command pulse(PULS)signal filter	0-15	4
PA82	Command pulse(SIGN)signal filter	0-15	4

5.1.3.3 Digital Output(DO)

Necessary parameters	Parameter Description	Parameter value	Factory default
PA16	Range of positioning completion	0-3000 pulses	10000
PA17	Position deviation limit	0-30000×100 pulses	0
PA18	Position deviation error	0-1	10000
PA83	CWL,CCWL prohibited mode	0-1	0
PA84	Hysteresis for position completion	0-32767	0
PA85	Range for approach positioning	0-32767	0
PA86	Hysteresis for approach positioning	0-32767	0

5.1.3.4 Input And Output Terminals

Necessary parameters	Parameter Description	Parameter value	Factory default
PA55	Input terminal effective level control word	0000-1111	0000
PA57	Output terminal effective level control word	0000-1111	0000
PA58	IO input terminal debounce time constant	1-20ms	2
P3-0	Digital input DI1 function	0-99	1
P3-1	Digital input DI2 function	0-99	2
P3-2	Digital input DI3 function	0-99	3
P3-3	Digital input DI4 function	0-99	4
P3-15	Digital input DI forced effective 1	00000000-11111111	00000000
P3-16	Digital input DI forced effective 2	00000000-11111111	00000000
P3-17	Digital input DI forced effective 3	00000000-11111111	00000000
P3-20	Digital output DO1 function	0-99	2
P3-21	Digital output DO2 function	0-99	3
P3-22	Digital output DO3 function	0-99	5
P3-23	Digital output DO4 function	0-99	8

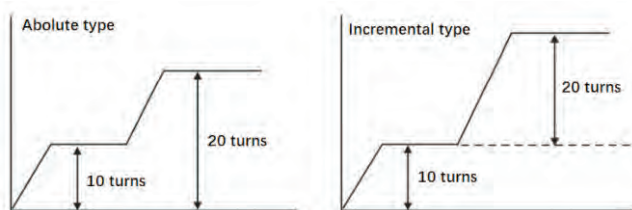
5.1.3.5 Position Command Introduction Of Internal Position Pr Mode

The Pr position command source is a set of 8 built-in location command registers using parameters (P4-2, P4-3) - (P4-23, P4-24), with external I/O (CN1, POS0-POS 2, and CTRG) that can select one of eight groups as location commands :

Name	POS2	POS1	POS0	CTRG	Parameter	Induction	Moving Speed Register
P1	0	0	0	↑	P4-2	Circle(+/-30000)	P4-4 (V1)
					P4-3	Pulse(+/-max cnt)	
P2	0	0	1	↑	P4-5	Circle(+/-30000)	P4-7 (V2)
					P4-6	Pulse(+/-max cnt)	
P3	0	1	0	↑	P4-8	Circle(+/-30000)	P4-10 (V3)
					P4-9	Pulse(+/-max cnt)	
P4	0	1	1	↑	P4-11	Circle(+/-30000)	P4-13 (V4)
					P4-12	Pulse(+/-max cnt)	
P5	1	0	0	↑	P4-14	Circle(+/-30000)	P4-16 (V5)
					P4-15	Pulse(+/-max cnt)	
P6	1	0	1	↑	P4-17	Circle(+/-30000)	P4-19 (V6)
					P4-18	Pulse(+/-max cnt)	
P7	1	1	0	↑	P4-20	Circle(+/-30000)	P4-22 (V7)
					P4-21	Pulse(+/-max cnt)	
P8	1	1	1	↑	P4-23	Circle(+/-30000)	P4-25 (V8)
					P4-24	Pulse(+/-max cnt)	

NOTE:

- The status of POS0-2:0 means contact is open (open), 1 means contact is closed (close). CTRG↑ represents the moment when the connection changes from open circuit (0) to circuit (1). max represents the command pulse of one revolution of the motor.
- The absolute position register has a wide range of applications, which is equivalent to a simple program control. Users only need to use the above table to easily complete periodic operations. For example, if the position command P1=10 revolutions and P2=20 revolutions, the position command P1 is issued first, and then the position command P2 is issued. Differences between P1 and P2 as below:



5.2 Speed Control Mode Wiring

5.2.1 Introduction

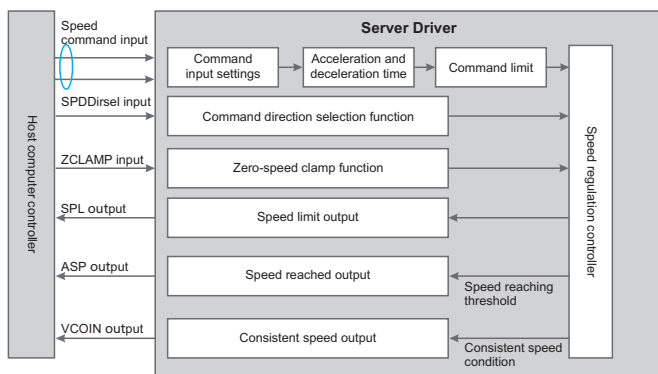


Figure 5.3 Speed Control Mode

The main steps for using speed mode are as follows:

- ❶ Properly connect the power supply of the servo main circuit and the control circuit, as well as the motor power cord and encoder line, the servo panel displays "r 0" after powering on, which means that the servo power supply and encoder wiring is correct.
- ❷ The servo JOG test run is carried out by pressing the button to confirm the normal operation of the motor.
- ❸ Refer to Figure 5.4 wiring to explain the required DI/DO signals in the connection CN1 terminal, such as servo enablement, alarm clearing, positioning completion signal, etc.

- ④ Set the speed mode. Set the DI/DO used based on the actual situation.
- ⑤ Servo enable, through the upper machine issued position command to control the rotation of the servo motor. First rotate the motor at low speed and confirm that the rotation direction and electronic gear ratio are correct, and then make a gain adjustment.

5.2.2 Speed Mode Wiring

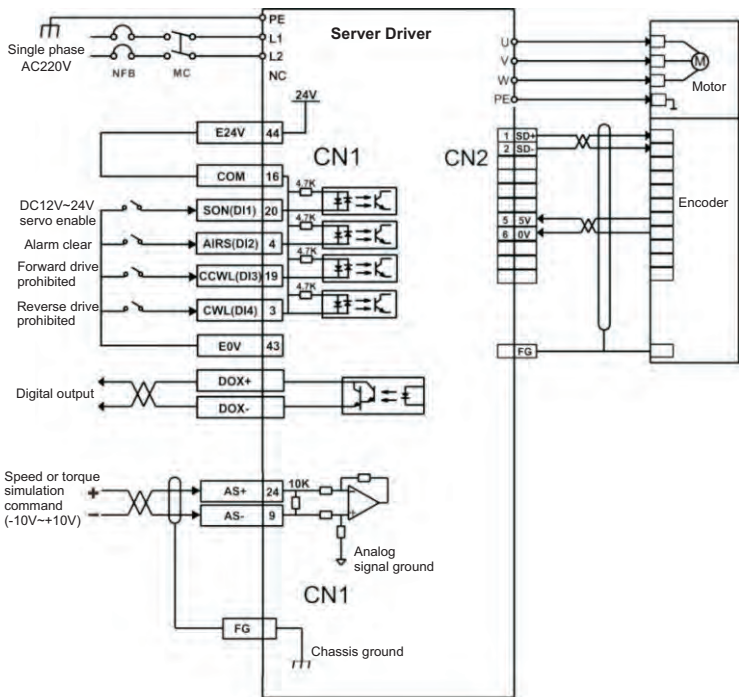


Figure 5.4 Speed mode wiring diagram

5.2.3 Parameter Settings In Speed Mode

5.2.3.1 Related parameters to be adjusted for speed control mode

Necessary parameters	Parameter Description	Parameter value	Factory default
PA4	Control method selection	1	0
PA5	Speed proportional gain	5-2000Hz	150
PA6	Speed integral constant	1-1000ms	75
PA22	Internal and external speed command selection	0-5	0
PA24	Internal speed 1	-6000-6000r/min	100
PA25	Internal speed 2	-6000-6000r/min	500
PA26	Internal speed 3	-6000-6000r/min	1000
PA27	Internal speed 4	-6000-6000r/min	2000
PA28	Arrival speed	0-3000r/min	3000
PA40	Acceleration time constant	1-10000ms	100
PA41	Deceleration time constant	1-10000ms	100
PA42	S type acceleration and deceleration time constant	0-1000ms	0
PA43	Analog speed command input gain	10-3000r/min/v	300
PA44	The direction of the analog speed command is reversed	0-1	0
PA45	Analog speed command zero offset compensation	-5000-5000	0
PA46	Analog speed command filter	1-300Hz	300
PA75	Zero speed detection point	0-1000r/min	10
PA76	Speed consistent setting value	0-1000r/min	10
PA87	Arrival speed difference	0-5000r/min	30
PA88	Polarity of arrival speed	0-1	0
PA92	Zero speed detection hysteresis	0-1000r/min	5

5.3 Torque control mode

5.3.1 Introduction

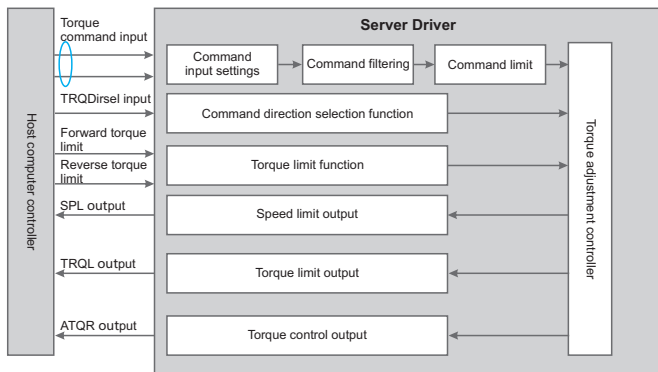


Figure 5.5 Torque Control Mode Block diagram

The main steps of using torque mode are as follows:

- ❶ Correctly connect the power supply of the servo main circuit and control circuit, as well as the motor power line and encoder line. After power-on, the servo panel displays "r 0", which means that the servo power supply and encoder wiring are correct.
- ❷ Carry out servo JOG test run by pressing the key to confirm whether the motor can run normally.
- ❸ Refer to Figure 5.6 for wiring instructions to connect the required DI/DO signals in the CN1 terminal, such as servo enable, alarm clear, positioning completion signal, etc.
- ❹ Make relevant settings for torque mode. Set the DI/DO used according to the actual situation.
- ❺ Servo enable, control the rotation of the servo motor through the position command issued by the upper computer. First, make the motor rotate at a low speed, and confirm whether the direction of rotation and the electronic gear ratio are normal, and then adjust the gain.

5.3.2 Torque mode wiring

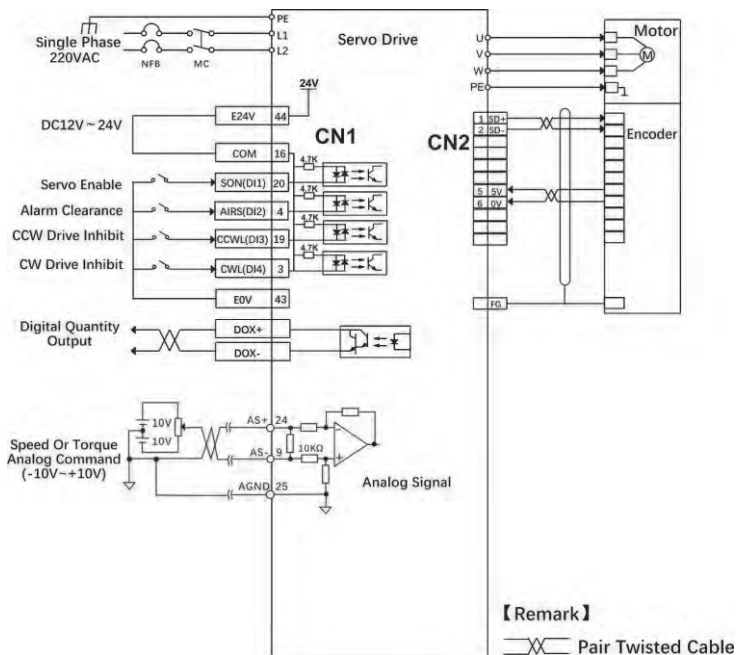


Figure 5.6 Torque mode wiring diagram

5.3.3 Parameter Settings In Torque Mode

5.3.3.1 Torque control mode needs to adjust parameters

Necessary parameters	Parameter Description	Parameter value	Factory default
PA4	Control method selection	2	0
PA29	Analog torque command input gain	Set as needed	30
PA32	Internal and external torque command selection	0-2	0
PA33	Analog torque command input direction is reversed	0	0
PA39	Analog torque command zero offset compensation	0	0
PA50	Speed limit during torque control	Set as needed	Rated speed
PA64	Internal torque 1	-300-300	0
PA65	Internal torque 2	-300-300	0
PA66	Internal torque 3	-300-300	0
PA67	Internal torque 4	-300-300	0
PA83	Prohibition method	0-1	0
PA89	Reach torque	-300%-300%	100
PA90	Reached torque difference	0%-300%	5
PA91	Reached torque polarity	0-1	0

5.4 Origin Regression function and description of relevant parameters

5.4.1 Relevant Parameter Settings

Necessary parameters	Parameter Description	Parameter value	Factory default
PA32	Origin detector type and search direction setting	0-5	0
PA33	Short-distance movement method setting to reach the origin	0-2	30
PA34	Origin trigger start mode	0-2	0
PA35	Origin stop mode setting	0-1	0

Necessary parameters	Parameter Description	Parameter value	Factory default
PA36	The first stage of high-speed home return speed setting	1-2000 r/min	1000
PA37	The second stage of low-speed home return speed setting	1-500 r/min	50
PA38	Origin return offset circle number	+/-30000	0
PA39	Origin return offset pulse number	+/-max cnt	0

5.4.2 Origin Regression Mode Introduction(Must be in internal position mode)

5.4.2.1 Origin trigger start mode (P4-34)

The origin trigger start mode is divided into two categories: the automatic execution origin regression function and the contact trigger origin regression function:

P4-34=0: Turn off origin regression. When P4-34 is set to 0, the origin regression function does not start regardless of the other setpoints.

P4-34=1: The origin regression function is automatically performed when the power is on. This function is only valid once when power supply and servo start-up inputs are made, i.e. under operating conditions where servo operation does not require repeated regression. Use this feature to omit an input contact to perform regression origin.

P4-34=2: The origin regression function is triggered by the SOM input contact. When setting this function, any register in the input pin function planning register (P3-0 to P3-3) must be set to the SOM trigger origin input function. THE Servo connection can be triggered at any time during servo operation and the origin regression function can be performed.

5.4.2.3 Origin detector type and direction setting (P4-32)

The origin detector can use the left or right limit switch as the origin reference point, or additional detectors, such as proximity or light gate switches, can be used as the origin reference point. The Z pulse can also be set as the origin reference point when the servo motor is only moving within one turn.

P4-32=0: Look for the origin in the forward direction and use the CCWL limit input point as a rough reference point for the origin. When origin positioning is complete, CCWL moves to the limit input function. Subsequent re-triggering will generate a limit warning, and when using the limit input point as a rough reference point for the origin, it is recommended to set the return to look for the Z pulse(P4-33=0) as the exact mechanical origin.

P4-32=1: The reverse direction looks for the origin and takes the CWL limit input point as a rough reference point for the origin. When origin positioning is complete, the CWL moves to the limit input function. Subsequent re-triggering will produce an extreme warning, and when using the limit input point as a rough reference point for the origin, it is recommended to set the return look for the Z pulse(P4-33s0) as the exact mechanical origin.

P4-32=2: Forward direction to find the origin, and orGP (external detector input point) as the reference point of the origin, at this time the precise mechanical origin can be set to return to look for(P4-33s 0) or not return to look for (P4-33s1) Z-phase pulse. When the Z-phase pulse is not used as the mechanical origin, the positive edge of orGP can also be set to the mechanical origin(P4-33s2).

P4-32=3: The reverse direction looks for the origin and uses ORGP (external detector input point) as the reference point for the origin. The precise mechanical origin can then be set to return a search(P4-33s0) or not a Z-phase pulse to look for(P4-33s1). When the Z-phase pulse is not used as the mechanical origin, the positive edge of orGP can also be set to the mechanical origin(P4-33s2).

P4-32=4: Forward direction directly looking for the absolute position zero of the single turn, this function is typically used for servo motors only in a range of motion control, at this time can not be external to any detection switch.

P4-32=5: Invert direction directly looking for the absolute position zero of the single turn, this function is typically used for servo motors only in a range of motion control, at this time can not be attached to any detection switch.

5.4.2.4 Movement mode setting of short distance to the origin (P4-33)

P4-33=0: After finding the reference origin, the motor folds back to find the nearest absolute position zero point at the second speed as the mechanical origin.

P4-33=1: After finding the reference origin, the motor turns to the second stage speed and continues to look forward for the nearest single-lap absolute position zero as the mechanical origin.

P4-33=2: Find the rising edge of the detector ORGP as the mechanical origin and slow down to stop, suitable for P4-32 values of 2 and 3 settings, or find the absolute position of the single lap zero point and slow stop, suitable for P4-32 value of 4 and 5 settings.

5.4.2.5 The mode setting of origin point stops (P4-35)

P4-35=0: After the origin detection is complete, the motor decelerates and pulls back to the origin. After the origin heartbeat is obtained during the second speed operation, the motor deceleration stops. Stop and then move to the mechanical origin position at a two-stage speed.

P4-35=1: After the origin detection is complete, the motor slows down in the forward direction and stops. After the origin heartbeat is obtained during the second speed operation, the motor deceleration stops. The positional override after the stop is no longer corrected, at which point the position of the mechanical origin does not change depending on the amount of position override.

5.5 Pre-operational Inspection

First remove the load connected to the servo motor, the coupling connected to the servo motor shaft, and its associated accessories. Ensure that the servo motor works properly without load before connecting the load to avoid unnecessary hazards.

✧ Before you run, check and make sure that:

- ① There is no obvious damage to the appearance of the servo drive;
- ② The wiring terminals have been insulated;

- ③ here are no conductive objects or flammable objects such as screws or metal pieces inside the driver, and there are no conductive foreign objects at the wiring ports;
 - ④ The servo drive or external braking resistor is not placed on combustible objects;
 - ⑤ The wiring is completed and the wiring is correct.
- ✧ The drive power supply, auxiliary power supply, ground terminal and so on are wired correctly, each control signal cable is wired correctly, and the limit switch and protection signal are all properly wired.
- ① The enable switch has been placed in the OFF state;
 - ② Cut off the power circuit and the emergency stop alarm circuit to maintain the access;
 - ③ The applied voltage reference of the servo drive is correct.
- ✧ Power up the servo drive without the controller sending a run command signal. Check and guarantee:
- ① The servo motor can rotate normally without vibration or excessive running sound;
 - ③ The parameters are set correctly. Unexpected actions may occur depending on the mechanical characteristics. Please do not over-set extreme parameters;
 - ⑤ There is no abnormality in bus voltage indicator and digital tube display.



Chapter 6

Operation and Display

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- 6.4 Status Monitoring.....70
- 6.5 Analog Quantity Zeroing Adjustment.....71
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6.1 Drive Panel Introduction

6.1.1 Front Panel

The panel consists of 5 digital LED and 4 buttons including ↑、↓、←、SET to display all system status and set parameters. The operation is hierarchical.← button indicates “back” and SET button indicates “forward” while it also has the meaning of “Enter” and ← button also has the meaning of “Cancel” and “Exit”. ↑ button indicates “Increasing ” and ↓ button indicates “decreasing”. If you press the ↑ button or ↓ button and maintain it, you would get a duplicate result and stay longer, the repetition rate is higher.

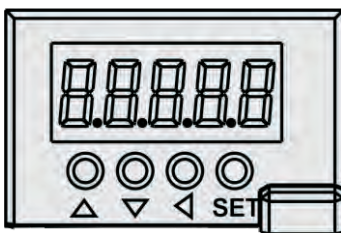


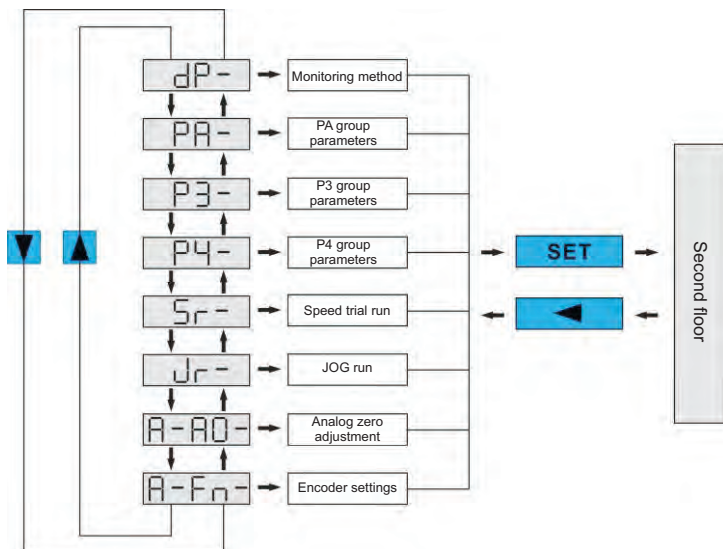
Figure 6.1 Drive panel display interface

6.1.2 Front Keys Introduction

Symbol	Name	Function
▲	Reducing	Increase sequence number or value; Press and hold to keep increasing
▼	Decrease key	Decrease sequence number or value; Press and hold to keep decreasing
◀	Exit	Menu exit or cancel the operation
SET	Confirm	Menu entered or confirm the operation

6.2 Main menu

The first layer is the main menu, there are 8 ways to operate, ▲、▼ Keys to change the mode, press the SET key to enter the second layer, perform specific operations, and press the key to return to the main menu from the second layer.



6.3 Steps To Set Parameters

Parameters are represented by parameter segment + parameter number, the hundreds digit is the segment number, and the tens and ones digits are the parameter numbers. For example, for parameter PA53, the segment number is "PA", the parameter number is "53", and the display shows "PA-53".

Select the parameter setting "P-" in the main menu, and press the SET key to enter the parameter setting mode. First use the ▲, ▼ keys to select the parameter section, after selecting, press the SET key to enter the parameter number selection of this section. Secondly, use the ▲, ▼ keys to select the parameter number, after selecting, press the SET key to display the parameter value.


Use ▲, ▼ keys to modify the parameter value. Press ▲ or ▼ key once to increase or decrease the parameter by 1, press and hold ▲ or ▼ to continuously increase or decrease the parameter. When the parameter value is



modified, press the **SET** key, the decimal point of the rightmost LED digital tube lights up and flashes twice, that is, the modification is completed, and the modified value will be immediately reflected in the control (some parameters need to be saved and then powered on again to take effect).

6.4 Status Monitoring

The first layer is used to choose how to operate, there are 7 ways, use **▲**、**▼** keys to change the mode, press the **SET** key to enter the second layer of the selected mode, and press the **▲** key to return to the first layer from the second layer.


Select "dp--" in the first layer, and press the **SET** key to enter the monitoring mode. There are a total of 25 display states. The user selects the desired display mode with the **▲**、**▼** keys, and then presses the **SET** key to enter the specific display state.

Monitoring method	Operate	Monitoring example	Illustrate
P-SPd	SET 	r 1000	Motor speed 1000r/min
P-PoS		04580	Current position 124580
P-PoS.		P. 12	
P-CPo		04581	Position command 124581
P-CPo.		C 12	
P-EPo		E. 4	Position deviation 4 pulses
P-EPo.		E. 0	
P-t-r		t0. 70	Motor torque 70%
P-I		I 2. 3	Motor current 2.3A
P-Cnt		Cnt 0	Current control mode 0: Position control mode
P- CS		r. 500	The speed corresponding to the analog input in speed mode is 500 r/min.
P- Ct		t 0. 50	The torque corresponding to the analog input in torque mode is 50%.

Monitoring method	Operate	Monitoring example	Illustrate	
P-AP ₀		A3265	The absolute position of the rotor is 3265.	
P-AP ₀ .		A. 0		
P- In		n. 1111	Input terminal	
P- oUt		oUt1111	Output terminal	
P-UdC		Uc336	Bus voltage 336V	
P-Err		Err 4	Alarm No. 4	
P- rL		rL-on	Relay open state	
		rL-of	Relay off state	
		rL-Err	Relay alarm status	
P- rO		rO-on	The main circuit is operating normally	
		rO-of	The main circuit is not charged	
		rO-CH	The main circuit is charged but the servo is not enabled	
		rO-Err	Main circuit alarm	
P- US		U-on	Bus voltage is normal	
		U-LoU	Bus voltage is too low	
		U-Err	There is an alarm	
P- AS			432 10	Motor absolute position 876543210
P- AS.			88765	

6.5 Analog Quantity Zeroing Adjustment

With this operation, the drive automatically detects the analog zero bias and writes the zero bias value to parameter PA39 (or Pa45). This operation has saved the zero-bias parameter to EEPROM, so no more parameter writes are required.

First select the analog zero "A-A0" and press  to enter. Then select speed

analog zero adjustment "A-SPd" or torque analog zero adjustment "A-Trq" through ▲, ▼, and after selecting the operation, press and hold the SET key for more than 3 seconds, and activate the operation after "donE" is displayed. After finishing, you can press ◀ again to return to the menu selection state.

6.6 Encoder Selection

Select "F-res" to reset the encoder operation, the encoder multi-circle information zero, through the P3-36 parameter value setting, the single-circle information can be zeroed to achieve the purpose of the origin; Press and hold the SET key for more than 3 seconds after selecting the operation, and after "donE" is displayed, activate the action. When you're done, press SET to return to the menu selection state.

6.7 How To Reset Default Parameters

In the following situations, please use the function of restoring default parameters (factory parameters):

- ✧ The parameters are adjusted disorderly, and the system cannot work normally.
 - ❶ Check whether the motor code (parameter PA1) is correct.
 - ❷ Change the password (PA0) to 385.
 - ❸ Enter parameter management and perform the following operations :

All parameters are restored as the default, and user-modified parameters are restored to factory defaults. Press ◀ to return to the main menu, use ▲, ▼ select "PA-" mode, press set key to enter the second layer of the interface, and then press ▲, ▼ so that PA-0, then press SET into the third layer of interface, PA0 set to the value 385, press SET to save. Next press ◀ to return to the "PA-" interface, and set PA1 to DEF-, press SET for 5 seconds, wait for the LED to flash a few times, complete the default parameter saving. Finally, power on again is valid.



Chapter 7

Parameters

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7.3 P4 Group Parameters For Internal Position Command.....	107

7.1 PA Group

Serial number	Name	Function	Parameter range	Factory value
0	password	1. The user password is 315. 2. The model code is 385.	0-9999	315
1	Model code	This parameter is read-only and cannot be modified. The driver automatically recognizes the motor model without selecting it.	40-80	See Table 7-1
2	Software version	You can view the software version number, but you cannot modify it.	-	-

Table 7-1

Drive	P100S-40	P100S-75
Motor	40-00130	80-01330
	40-00330	80-02430
	60-00630	80-03230
	60-01330	
	60-01930	
	80-01330	

Serial number	Name	Function	Parameter range	Factory value
3	Initial display state	0: Display motor speed; 1: Display the lower 5 digits of the current position; 2: Display the upper 5 digits of the current position; 3: Display the lower 5 digits of position command (accumulated amount of command pulse); 4: Display position command (accumulated amount of command pulse) high 5 digits; 5: Display the lower 5 digits of the position deviation; 6: Display position deviation high 5 digits; 7: Display motor torque; 8: Display motor current;	0-25	0

Serial number	Name	Function	Parameter range	Factory value
3	Initial display state	9: Current control mode; 10: Display the current temperature; 11: Display speed command; 12: Display torque command; 13: Display the lower 5 positions of the absolute position of the rotor in one revolution; 14: Display the upper 5 digits of the absolute position of the rotor in one revolution; 15: Display the status of the input terminal; 16: Display the status of the output terminal; 17: Display the encoder input signal; 18: Display the bus voltage value of the main circuit; 19: Display the alarm code; 20: Display the version number of the logic chip; 21: Display the pull-in state of the relay; 22: Display running status; 23: Display the external voltage status; 24: Display the lower 5 digits of the absolute value position; 25: Display the upper 5 digits of the absolute value position.	0-25	0
4	Control method selection	This parameter allows you to set the way the drive is controlled: 0: Position control mode; 1: speed control mode; 2: torque control mode; 3: Position speed mixed control mode; 4: Position torque mixing control mode; 5: Speed torque mixing control mode; 6: Encoder zero mode.	0-6	0
5	Speed proportional gain	1. Set the proportional gain of the speed ring regulator. 2. The higher the set value, the higher the gain and the greater the stiffness. The parameter values are determined according to the specific	5-2000Hz	150

Serial number	Name	Function	Parameter range	Factory value
5	Speed proportional gain	servo drive system model and load conditions. In general, the greater the load inertia, the larger the setting. 3. Set as large as possible without oscillating the system.	5-2000Hz	150
6	Speed integral constant	1. Set the integral time constant of the speed loop regulator. 2. The smaller the setting value, the faster the integration speed, and the stronger the system resists deviation, that is, the greater the stiffness, but too small an overshoot is likely to occur.	1-1000ms	150
7	Torque filter	1. Set the torque command filter characteristics. 2. Used to suppress the resonance generated by the torque. 3. The smaller the value, the lower the cut-off frequency, and the less vibration and noise the motor produces. If the load inertia is large, the set value can be reduced appropriately. The value is too small, causing the response to slow down and may cause oscillations. 4. The higher the value, the higher the cutoff frequency and the faster the response. If a high torque response is required, the setting can be increased appropriately.	1-1000ms	75
8	Speed detection filter	1. Set the speed detection filter characteristics. 2. The smaller the value, the lower the cut-off frequency, and the less noise the motor produces. If the load inertia is large, the set value can be reduced appropriately. The value is too small, causing the response to slow down and may cause oscillations. 3. The higher the value, the higher the cutoff frequency, and the faster the feedback response. If a high speed response is required, the setting can be increased appropriately.	20-500%	100
9	Position proportional gain	1. Set the proportional gain of the position ring regulator. 2. The higher the set value, the higher the gain, the greater the stiffness, the smaller the position	1-1000	80

Serial number	Name	Function	Parameter range	Factory value																	
9	Position proportional gain	lag under the same frequency command pulse conditions. However, a value that is too large may cause oscillations. 3. The parameter values are determined according to the specific servo drive system model and load conditions.	1-1000	80																	
11	Number of command pulses per motor revolution	1. Set the number of command pulses equivalent to 1 revolution per rotation of the motor. 2. When the setting value is 0, PA-12 (position command pulse divider molecule) and PA-13 (position command pulse divider) are valid.	0-30000	10000																	
12	Position command pulse electronic gear first numerator	<p>1. Set the division/multiplication frequency of the position command pulse (electronic gear).</p> <p>2. In the position control mode, by setting the parameters of PA12 and PA13, it can be easily matched with various pulse sources to achieve the user's ideal control resolution (ie angle/pulse).</p> <p>3. $P \times G = N \times C \times 4$.</p> <p>P: pulse number of input command; G: electronic gear ratio; G=frequency division numerator/frequency division denominator N: motor rotation number; C: photoelectric encoder line/revolution, this system C=2500.</p> <p>4. For example, when the input command pulse is 6000, the servo motor rotates once $G = (N \times C \times 4) / P = (1 \times 2500 \times 4) / 6000 = 5/3$</p> <p>Then the parameter PA12 is set to 5, and PA13 is set to 3.</p> <table border="1" data-bbox="298 1090 733 1297"> <thead> <tr> <th colspan="2">DI Signals (Notes)</th> <th rowspan="2">Command pulsed electronic gear denominator</th> </tr> <tr> <th>Gear 2</th> <th>Gear 1</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>First molecule (parameter PA12)</td> </tr> <tr> <td>0</td> <td>1</td> <td>Second molecule (parameter PA 77)</td> </tr> <tr> <td>1</td> <td>0</td> <td>Third molecule (parameter PA 78)</td> </tr> <tr> <td>1</td> <td>1</td> <td>Fourth molecule (parameter PA 79)</td> </tr> </tbody> </table> <p>5. The numerator of the command pulse electronic gear is determined by Gear1 and</p>	DI Signals (Notes)		Command pulsed electronic gear denominator	Gear 2	Gear 1	0	0	First molecule (parameter PA12)	0	1	Second molecule (parameter PA 77)	1	0	Third molecule (parameter PA 78)	1	1	Fourth molecule (parameter PA 79)	0-32767	0
DI Signals (Notes)		Command pulsed electronic gear denominator																			
Gear 2	Gear 1																				
0	0	First molecule (parameter PA12)																			
0	1	Second molecule (parameter PA 77)																			
1	0	Third molecule (parameter PA 78)																			
1	1	Fourth molecule (parameter PA 79)																			

Serial number	Name	Function	Parameter range	Factory value
12	Position command pulse electronic gear first numerator	Gear2. The denominator is set by parameter PA13. The combination is as follows: Note: 0 means OFF, 1 means ON.	0-32767	0
13	Position command pulse electronic gear denominator	See parameter Pa12.	1-32767	10000
14	Position command pulse input method	<ol style="list-style-type: none"> 1. Set the input form of the position command pulse. 2. Set the parameters to one of the three input modes: 0: Pulse-plus direction; 1: CCW pulse/CW pulse; 2: A, B two-phase orthogonal pulse input; 3: Internal location input. <p>Note: CCW is axial observation from the servo motor, rotating in an anti-clockwise direction, defined as forward, and CW is observed from the axial direction of the servo motor, rotating clockwise, defined as reverse.</p>	0-3	0
15	Inverted command pulse direction	Set to: 0: Normal; 1: Position command pulse direction is reversed.	0-1	0
16	Positioning completion range	<ol style="list-style-type: none"> 1. Position the complete pulse range under position control. 2. This parameter provides the basis for the drive to determine whether to complete the positioning under position control. When the remaining pulses in 	0-30000 pulses	130

Serial number	Name	Function	Parameter range	Factory value
16	Positioning completion range	the position deviation counter are less than or equal to the set value of this parameter, the digital output DO's COIN (positioning complete) ON, otherwise OFF. 3. Comparator has a return function. Set by parameter Pa84.	0-30000 pulses	130
17	Position tolerance range detection	1. Set the position difference alarm detection range. 2. Under position control mode, the driver gives a position alarm when the value of the position deviation counter exceeds the value of this parameter.	0-30000 ×100 pulse	6000
18	Invalid position error	Set to: 0: Positional difference alarm detection is effective; 1: Position difference alarm detection is not valid, stop detection location error.	0-1	0
19	Position command smoothing filter	1. Smooth filtering of the command pulse, with exponential acceleration and deceleration, the value represents the time constant. 2. The filter does not lose input pulses, but instruction delays occur. 3. This filter is used to: ① The upper controller has no deceleration function; ② Electronic gears are multiplied in larger frequencies (> 10); ③ The instruction frequency is low. 4. Step jumps and unevenness occur when the motor is running. 5. When set to 0, the filter does not work.	0-1000 ×0.1ms	100

Serial number	Name	Function	Parameter range	Factory value																	
20	Drive prohibition input is invalid	<p>Set as:</p> <p>0: CCW, CW input prohibition is valid. When the CCW drive prohibition switch (FSTP) is ON, the CCW drive is allowed; when the CCW drive prohibition switch (FSTP) is OFF, the CCW direction torque remains at 0; the same is true for CW. If both CCW and CW drive prohibitions are OFF, a drive prohibition input error alarm will be generated;</p> <p>1: Cancel CCW and CW input prohibition. Regardless of the status of the CCW and CW drive prohibition switches, both CCW and CW drive are allowed. At the same time, if both CCW and CW drive prohibition are OFF, no drive prohibition input error alarm will be generated.</p>	0-1	1																	
21	JOG running speed	Set the speed at which the JOG operation will run.	0-6000 r/min	100																	
22	Speed command source	<p>During speed control, set the source of the speed command, the meaning of the parameter:</p> <p>0: Analog speed command is input by analog port AS+, AS-;</p> <p>1: Internal speed command, determined by SP1 and SP2 input by DI:</p> <table border="1" data-bbox="339 1108 741 1316"> <thead> <tr> <th colspan="2">DI Signals (Notes)</th> <th rowspan="2">Command pulsed electronic gear denominator</th> </tr> <tr> <th>SP2</th> <th>SP1</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Internal speed 1 (parameter PA24)</td> </tr> <tr> <td>0</td> <td>1</td> <td>Internal speed 2 (parameter PA25)</td> </tr> <tr> <td>1</td> <td>0</td> <td>Internal speed 3 (parameter PA26)</td> </tr> <tr> <td>1</td> <td>1</td> <td>Internal speed 4 (parameter PA27)</td> </tr> </tbody> </table>	DI Signals (Notes)		Command pulsed electronic gear denominator	SP2	SP1	0	0	Internal speed 1 (parameter PA24)	0	1	Internal speed 2 (parameter PA25)	1	0	Internal speed 3 (parameter PA26)	1	1	Internal speed 4 (parameter PA27)	0-5	0
DI Signals (Notes)		Command pulsed electronic gear denominator																			
SP2	SP1																				
0	0	Internal speed 1 (parameter PA24)																			
0	1	Internal speed 2 (parameter PA25)																			
1	0	Internal speed 3 (parameter PA26)																			
1	1	Internal speed 4 (parameter PA27)																			

Serial number	Name	Function	Parameter range	Factory value																	
22	Speed command source	<p>2: Analog speed command + internal speed command:</p> <table border="1"> <thead> <tr> <th colspan="2">DI Signals (Notes)</th> <th rowspan="2">Command pulsed electronic gear denominator</th> </tr> <tr> <th>SP2</th> <th>SP1</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Analog volume speed instructions</td> </tr> <tr> <td>0</td> <td>1</td> <td>Internal speed 2 (parameter PA25)</td> </tr> <tr> <td>1</td> <td>0</td> <td>Internal speed 3 (parameter PA26)</td> </tr> <tr> <td>1</td> <td>1</td> <td>Internal speed 4 (parameter Pa27)</td> </tr> </tbody> </table> <p>Note: 0 means OFF, 1 means ON.</p> <p>3: JOG speed command, when inching (JOG) operation, Need to be set.</p> <p>4: Keyboard speed command, when performing keyboard speed regulation (Sr) operation, Need to be set.</p> <p>5: IO terminal controls jog operation.</p>	DI Signals (Notes)		Command pulsed electronic gear denominator	SP2	SP1	0	0	Analog volume speed instructions	0	1	Internal speed 2 (parameter PA25)	1	0	Internal speed 3 (parameter PA26)	1	1	Internal speed 4 (parameter Pa27)	0-5	0
DI Signals (Notes)		Command pulsed electronic gear denominator																			
SP2	SP1																				
0	0	Analog volume speed instructions																			
0	1	Internal speed 2 (parameter PA25)																			
1	0	Internal speed 3 (parameter PA26)																			
1	1	Internal speed 4 (parameter Pa27)																			
23	Maximum speed limit	<p>Set the maximum speed limit for the servo motor.</p> <p>1. Independent of the direction of rotation.</p> <p>2. If the setting exceeds the rated speed, the actual maximum speed limit is the rated speed.</p>	0-6000 r/min	5000																	
24	Internal speed 1	<p>1. Set the internal speed1.</p> <p>2. Speed control mode (PA22=0), when SP1 OFF, When SP2 OFF, select internal speed 1 as the speed instruction.</p>	-6000-6000 r/min	100																	
25	Internal speed 2	<p>1. Set internal speed 2.</p> <p>2. In speed control mode (PA22=0), when SP1 is ON and SP2 is OFF, select internal speed 2 as the speed indicator.</p>	-6000-6000 r/min	500																	

Serial number	Name	Function	Parameter range	Factory value											
26	Internal speed 3	1. Set the internal speed 3. 2. Under speed control (PA22-0), when SP1 OFF, SP2 ON, select the internal speed 3 as the speed command.	-6000-6000 r/min	1000											
27	Internal speed 4	1. Set the internal speed4. 2. Under speed control (PA22-0), when SC1 ON, SC2 ON, select the internal speed 4 as the speed command.	-6000-6000 r/min	2000											
28	Arrival speed	1. When the motor speed exceeds this parameter, the ASP of the digital output DO (Speed reached) ON, otherwise OFF. 2. The comparator has a hysteresis function, which is set by parameter Pa87. 3. With polarity setting function: <table border="1" data-bbox="339 783 743 919"> <thead> <tr> <th>PA88</th> <th>PA28</th> <th>Comparator</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>>0</td> <td>Speed regardless of direction</td> </tr> <tr> <td rowspan="2">1</td> <td>>0</td> <td>Only positive speed is detected</td> </tr> <tr> <td><0</td> <td>Only the reversal speed is detected</td> </tr> </tbody> </table>	PA88	PA28	Comparator	0	>0	Speed regardless of direction	1	>0	Only positive speed is detected	<0	Only the reversal speed is detected	0-3000 r/min	3000
PA88	PA28	Comparator													
0	>0	Speed regardless of direction													
1	>0	Only positive speed is detected													
	<0	Only the reversal speed is detected													
29	Analog torque command input gain	1. Set the proportional relationship between the analog torque input voltage and the actual running torque of the motor. 2. The unit of the set value is 0.1v/100%. 3. The default value is 30, corresponding to 3v/100%, that is, inputting 3v voltage produces 100% rated torque.	10-100 (0.1v/100%)	30											

Serial number	Name	Function	Parameter range	Factory value																	
30	User torque overload alarm value	<p>1. Set the user torque overload value, which is a percentage of the rated torque, the torque limit value regardless of direction, both positive and negative directions are protected.</p> <p>2. In the case of PA31 > 9, when the motor torque > PA30, the duration > PA31 case, the driver alarm, alarm number is Err-29, the motor stop. After the alarm is generated, the drive must be re-powered up to clear the alarm.</p>	1-300	300																	
31	User torque overload alarm detection time	<p>1. User torque overload detection time, in milliseconds.</p> <p>2. When set to zero, the user torque overload alarm does not work.</p>	0-32767	0																	
32	Torque command source	<p>During torque control, set the source of torque command:</p> <p>0: Analog torque command, input by analog ports AS+ and AS-.</p> <p>1: Internal torque command, determined by TRQ1 and TRQ2 input by DI:</p> <table border="1" data-bbox="339 943 741 1152"> <thead> <tr> <th colspan="2">DI Signals (Notes)</th> <th rowspan="2">Torque command</th> </tr> <tr> <th>TRQ2</th> <th>TRQ1</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Internal torque 1 (parameter PA64)</td> </tr> <tr> <td>0</td> <td>1</td> <td>Internal torque 2 (parameter PA65)</td> </tr> <tr> <td>1</td> <td>0</td> <td>Internal torque 3 (parameter PA66)</td> </tr> <tr> <td>1</td> <td>1</td> <td>Internal torque 4 (parameter PA67)</td> </tr> </tbody> </table> <p>2: Analog torque command + internal torque command:</p>	DI Signals (Notes)		Torque command	TRQ2	TRQ1	0	0	Internal torque 1 (parameter PA64)	0	1	Internal torque 2 (parameter PA65)	1	0	Internal torque 3 (parameter PA66)	1	1	Internal torque 4 (parameter PA67)	0-1	0
DI Signals (Notes)		Torque command																			
TRQ2	TRQ1																				
0	0	Internal torque 1 (parameter PA64)																			
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1	1	Internal torque 4 (parameter PA67)																			

Serial number	Name	Function	Parameter range	Factory value																	
32	Torque command source	<table border="1"> <thead> <tr> <th colspan="2">DI Signals (Notes)</th> <th rowspan="2">Torque command</th> </tr> <tr> <th>TRQ2</th> <th>TRQ1</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Analog torque command</td> </tr> <tr> <td>0</td> <td>1</td> <td>Internal torque 2 (parameter PA65)</td> </tr> <tr> <td>1</td> <td>0</td> <td>Internal torque 3 (parameter PA66)</td> </tr> <tr> <td>1</td> <td>1</td> <td>Internal torque 4 (parameter Pa67)</td> </tr> </tbody> </table>	DI Signals (Notes)		Torque command	TRQ2	TRQ1	0	0	Analog torque command	0	1	Internal torque 2 (parameter PA65)	1	0	Internal torque 3 (parameter PA66)	1	1	Internal torque 4 (parameter Pa67)	0-1	0
		DI Signals (Notes)		Torque command																	
		TRQ2	TRQ1																		
		0	0	Analog torque command																	
		0	1	Internal torque 2 (parameter PA65)																	
1	0	Internal torque 3 (parameter PA66)																			
1	1	Internal torque 4 (parameter Pa67)																			
Note: 0 means OFF, 1 means ON.																					
33	Analog torque command input direction Take the opposite	Polarity reverse for analog torque input.	0-1	0																	
					34	Internal CCW torque limit	1. The setting value is a percentage of the rated torque, for example, 200 if it is set to 2 times the rated torque. 2. This restriction is in effect at all times. 3. If the set value exceeds the maximum overload capacity allowed by the system, the actual torque is limited to the maximum overload capacity allowed by the system.	0-300%	300												
										35	Internal CW torque limit	1. The setting value is a percentage of the rated torque, e.g. 2 times the rated torque, then the setting value is -200. 2. This restriction is in effect at all times. 3. If the set value exceeds the maximum overload capacity allowed by the system, the actual torque is limited to the maximum overload capacity allowed by the system.	-300-0%	-300							
36	External CCW torque limit	1. The setting value is a percentage of the rated torque, for example, 100 if it is set to 1 times the rated torque.	0-300%	100																	

Serial number	Name	Function	Parameter range	Factory value
36	External CCW torque limit	<p>2. This limit is valid only when CCW torque limit input terminal (CCWL)ON is used.</p> <p>3. When the limit is in effect, the actual torque limit is the minimum of the maximum overload capacity allowed by the system, the internal CCW torque limit, and the external CCW torque limit.</p>	0-300%	100
37	External CW moment limit	<p>Set the external torque limit in the CW direction of the servo motor.</p> <p>1. The setting value is a percentage of the rated torque, for example, 1 times the rated torque, the setting value is -100.</p> <p>2. This limit is valid only when the CW torque limit input terminal (CWL)ON is used.</p> <p>3. When the limit is in effect, the actual torque limit is the minimum absolute value of the maximum overload capacity allowed by the system, the internal CW torque limit, and the external CW torque limit.</p>	-300-0%	-100
38	Temperature alarm value	Set the drive temperature to the upper alarm value.	200-1350	
39	Zero-bias compensation for analog torque commands	Zero-bias compensation for the analog torque input.	-2000-2000	0
40	Acceleration time constant	<p>The setting value is the acceleration time of the motor from 0-1000r/min.</p> <p>1. The acceleration and deceleration characteristics are linear.</p> <p>2. Only for speed control and internal position control, other control methods are not valid.</p>	1-10000 ms	100

Serial number	Name	Function	Parameter range	Factory value
41	Deceleration time constant	The setting value is to indicate the deceleration time of the motor from 1000-0r/min. 1. The acceleration and deceleration characteristics are linear. 2. Only for speed control and internal position control, other control methods are not valid.	1-10000 ms	100
42	S type acceleration and deceleration time constant	To smooth the start and stop of the motor, set the S-type plus-deceleration curve part of the time.	0-1000 ms	0
43	Analog speed command input gain	Sets the proportional relationship between the analog speed input voltage and the actual running speed of the motor.	10-3000 r/min/v	300
44	The direction of the analog speed command is reversed	Polarity reverses to the analog speed input. 1. When set to 0, the analog speed command is positive and the speed direction is CCW. 2. When set to 1, the analog speed command is positive and the speed direction is CW.	0-1	0
45	Analog speed command zero offset compensation	Zero-bias compensation for analog speed input.	-5000-5000	0
46	Analog speed command filter	1. Low-pass filter for analog speed input. 2. The larger the setting, the faster the response speed to the speed input analog volume, the greater the signal noise impact, the smaller the setting, the slower the response speed, the smaller the signal noise impact.	1-1000 Hz	300

Serial number	Name	Function	Parameter range	Factory value
47	Mechanical brake action setting when the motor stops	<p>1. Define the delay time from the mechanical brake action (output BRK from ON to OFF) to the motor current cut-off during motor stop.</p> <p>2. This parameter should not be less than the delay time (T_b) of the mechanical brake to avoid minor displacements or operating drops of the motor.</p>	0-200 ×10ms	0
48	Mechanical brake action setting when the motor is running	<p>1. Define the delay time from the motor current cut off to the mechanical braking action (output BRK from ON to OFF) during motor stop.</p> <p>2. This parameter is designed to allow the motor to slow down from the telling rotation to a low speed, and then to make the mechanical brake action to avoid damage to the brake.</p> <p>3. The actual action time is the time required for the PA48 or motor to decelerate to the PA49 value, taking both minimum values.</p>	0-200 ×10ms	50
49	Operating speed of the mechanical brake when the motor is running	<p>1. Define the speed value from the motor current cut off to the mechanical brake action (output terminal BRK changed from ON to OFF) during motor operation.</p> <p>2. The actual action time is the time required for the PA48 or motor to decelerate to the PA49 value, taking the minimum of both.</p>	0-3000 r/min	100
50	Speed limit during torque control	<p>1. When torque control is in place, the motor operating speed is limited to this parameter.</p> <p>2. Speeding on light loads can be prevented.</p>	0-5000 r/min	3000

Serial number	Name	Function	Parameter range	Factory value								
53	Servo forced enable	Set to: 0: The enable signal is controlled by the SON input of DI; 1: Software force enablement.	0-1	0								
54	Servo enable delay close time	Defines the time when the motor current is delayed when the servo enable signal is switched off.	0-30000 ms	0								
55	Input terminal effective level control word	<p>1. Set the input terminal to reverse. Terminals that do not take reverses are valid when the switch is open and closed, and terminals that are not valid when the switch is open and closed, and terminals that are not valid when the switch is switched off.</p> <p>2. In the form of a 4-bit binary number, the bit of 0 indicates that the output terminal represents no reversal, and 1 represents the counter-measure of the output terminal.</p> <p>The input terminals represented by binary numbers are as follows:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>3</th> <th>2</th> <th>1</th> <th>0</th> </tr> </thead> <tbody> <tr> <td>DI4</td> <td>DI3</td> <td>DI2</td> <td>DI1</td> </tr> </tbody> </table> <p>0: High level is effective; 1: Low level is effective.</p>	3	2	1	0	DI4	DI3	DI2	DI1	0000-1111	0000
3	2	1	0									
DI4	DI3	DI2	DI1									
57	Output terminal effective level control word	<p>1. Set the output terminal to reverse. The definition of reverse terminals, on and cut-off is the opposite of the standard definition.</p> <p>2. In the form of a 4-bit binary number, the output terminal represented by 0 is not reversed, and the output terminal represented by 1 is reversed.</p> <p>The input terminals represented by binary numbers are as follows:</p>	0000-1111	0000								

Serial number	Name	Function	Parameter range	Factory value								
57	Output terminal effective level control word	<table border="1"> <thead> <tr> <th>3</th> <th>2</th> <th>1</th> <th>0</th> </tr> </thead> <tbody> <tr> <td>DO4</td> <td>DO3</td> <td>DO2</td> <td>DO1</td> </tr> </tbody> </table> <p>0: High level is effective; 1: Low level is effective.</p>	3	2	1	0	DO4	DO3	DO2	DO1	0-5000 r/min	3000
3	2	1	0									
DO4	DO3	DO2	DO1									
58	IO input terminal debounce time constant	<p>1. De-jitter filter time for the input terminals.</p> <p>2. The smaller the value, the faster the terminal input response.</p> <p>3. The higher the value, the better the anti-jamming performance of the terminal input, but the slower the response.</p>	1-20ms	2								
59	Command pulse valid edge	Set to: 0: Pulse rising edge is effective; 1: The pulse drop edge is valid.	0-1	0								
60	Soft reset	0: Soft reset is not valid; 1: The soft reset is valid and the system will restart.	0-1	0								
61	System alarm cleared	Set as: 0: System alarm clearing is invalid; 1: The system alarm clearing is effective.	0-1	0								
62	Encoder selection	4: Single-circle absolute value encoder; 5: Multi-circle absolute value encoder.	4-5	Determined by the motor								
63	Load inertia ratio	<p>1. Set the load inertia ratio of the corresponding motor rotation inertia.</p> <p>2. The setting is: ((load inertia plus rotational inertia) / rotational inertia) × 100.</p>	1-500	100								
64	Internal torque 1	In torque control mode (PA4=2), when TRQ1 is OFF, when TRQ2 is OFF, select internal torque 1 as torque command.	-300-300	0								

Serial number	Name	Function	Parameter range	Factory value
65	Internal torque 2	In torque control mode (PA4=2), when TRQ1 is ON, when TRQ2 is OFF, select internal torque 2 as torque command.	-300-300	0
66	Internal torque 3	In torque control mode (PA4=2), when TRQ1 is OFF, when TRQ2 is ON, select internal torque 3 as torque command.	-300-300	0
67	Internal torque 4	In torque control mode (PA4=2), when TRQ1 is ON, when TRQ2 is ON, select internal torque 4 as torque command.	-300-300	0
71	MODBUS slave address	MODBUS communication from the machine address value.	1-254	1
72	MODBUS communication baud rate	MODBUS Communication Baud Rate.	48-1152 ×100	1
73	MODBUS communication protocol selection	<p>Set to:</p> <p>0: 8, N, 2 (MODBUS, RTU); 1: 8, E, 1 (MODBUS, RTU); 2: 8, O, 1 (MODBUS, RTU); 3: 8, N, 1 (MODBUS, RTU).</p> <p>This parameter determines the communication protocol, the number 8 indicates that the transmitted data bit is 8 bits, and the English letters N, E, O represent parity:</p> <p>N: indicates that this bit is not used; E: represents 1 even position; O: Represents 1 odd bit.</p> <p>The number 1 or 2 indicates that the communication bit is 1 or 2 bits.</p>	0-3	0

Serial number	Name	Function	Parameter range	Factory value
74	Communication error handling	When the communication signal is wrong, select: 0: Continue to operate; 1: Alarm and stop operation.	0-1	1
75	Zero speed detection point	1. When the motor speed is lower than this parameter, the ZSP (zero speed) of the digital output DO is ON, otherwise it is OFF. 2. When the ZCLAMP of the digital input DI is ON and the speed command value is lower than this value, the speed command value is forced to zero.	0-1000 r/min	10
76	Speed consistent setting value	When the difference between the actual speed and the command speed is less than this setting, the UCO2N (speed consistent) of the digital output DO is ON, otherwise it is OFF.	0-1000 r/min	10
77	Position command pulse electronic gear ratio second numerator	See parameter PA12 for details.	0-32767	0
78	Position command pulse electronic gear ratio third numerator	See parameter PA12 for details.	0-32767	0
79	Position command pulse electronic gear ratio fourth numerator	See parameter PA12 for details.	0-32767	0
80	Command direction signal effective level	Set as: 0: High level positive direction; 1: Low level positive direction.	0-1	0

Serial number	Name	Function	Parameter range	Factory value
81	Command pulse PULS signal filtering	<p>1. For the pulse input PULSE signal digital filtering, the larger the value, the greater the filter time constant.</p> <p>2. By default, the maximum pulse input frequency is 500kHz (kpps), and the larger the value, the lower the maximum pulse input frequency.</p> <p>3. Used to filter out noise on the signal line to avoid counting errors. If there is a phenomenon of not being allowed to go due to the count, the parameter value can be increased appropriately.</p> <p>4. After the parameters have been modified, they must be saved and powered on again before they are valid.</p>	0-15	4
82	Command pulse SIGN signal filtering	<p>1. For the pulse input SIGNAL signal digital filtering, the larger the value, the greater the filter time constant.</p> <p>2. By default, the maximum pulse input frequency is 500kHz (kpps), and the larger the value, the lower the maximum pulse input frequency.</p> <p>3. Used to filter out noise on the signal line to avoid counting errors. If there is a phenomenon of not being allowed to go due to the count, the parameter value can be increased appropriately.</p> <p>4. After the parameters have been modified, they must be saved and powered on again before they are valid.</p>	0-15	4

Serial number	Name	Function	Parameter range	Factory value
83	CWL, CCWL direction prohibition method	<p>1. This parameter is used to select the prohibited method when the machine touches the mechanical limit switch and triggers the CWL, CCWL limit.</p> <p>Parameter meaning: 0: Limit the torque in this direction to 0; 1: Pulse input in this direction is prohibited.</p>	0-1	0
84	Positioning complete return difference	<p>1. Position the complete pulse range under position control.</p> <p>2. When the remaining pulses in the position deviation counter are less than or equal to the set value of this parameter, the digital output DO's COIN (positioning complete) ON, otherwise OFF.</p> <p>3. The comparator has a return function, set by parameter Pa85.</p>	0-32767 pulse	65
85	Positioning proximity	<p>1. Position close to pulse range under position control.</p> <p>2. When the remaining pulses in the position deviation counter are less than or equal to the set value of this parameter, the DIGITAL output DO's NEAR (nearby positioning) ON, otherwise OFF.</p> <p>3. The comparator has a return function, set by parameter Pa86.</p> <p>4. Used to prepare for the next step by accepting the NEAR signal when the positioning is about to be completed. The general parameter value is greater than the positioning completion range.</p>	0-32767 pulse	6500

Serial number	Name	Function	Parameter range	Factory value											
86	Positioning approach difference	See the description of parameter Pa85.	0-32767 pulse	65											
87	Arrival speed difference	<p>1. When the motor speed exceeds this parameter, the ASP (speed arrival) of the digital output DO is ON, otherwise it is OFF.</p> <p>2. The comparator has a hysteresis function.</p> <p>3. With polarity setting function:</p> <table border="1"> <thead> <tr> <th>PA88</th> <th>PA28</th> <th>Comparator</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>>0</td> <td>Speed regardless of direction</td> </tr> <tr> <td rowspan="2">1</td> <td>>0</td> <td>Only positive speed is detected</td> </tr> <tr> <td><0</td> <td>Only the reversal speed is detected</td> </tr> </tbody> </table>	PA88	PA28	Comparator	0	>0	Speed regardless of direction	1	>0	Only positive speed is detected	<0	Only the reversal speed is detected	0-5000 r/min	30
PA88	PA28	Comparator													
0	>0	Speed regardless of direction													
1	>0	Only positive speed is detected													
	<0	Only the reversal speed is detected													
88	Reach speed polarity	Refer to the description of parameter Pa87.	0-1	0											
89	Reach torque	<p>1. When the motor torque exceeds this parameter, the ATRQ (torque arrival) of the digital output DO is ON, otherwise it is OFF.</p> <p>2. The comparator has a hysteresis function, which is set by the parameter Pa90.</p> <p>3. With polarity setting function:</p> <table border="1"> <thead> <tr> <th>PA88</th> <th>PA28</th> <th>Comparator</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>>0</td> <td>Speed regardless of direction</td> </tr> <tr> <td rowspan="2">1</td> <td>>0</td> <td>Only positive torque is detected</td> </tr> <tr> <td><0</td> <td>Only the reversal speed is detected</td> </tr> </tbody> </table>	PA88	PA28	Comparator	0	>0	Speed regardless of direction	1	>0	Only positive torque is detected	<0	Only the reversal speed is detected	-300%-300%	100
PA88	PA28	Comparator													
0	>0	Speed regardless of direction													
1	>0	Only positive torque is detected													
	<0	Only the reversal speed is detected													

Serial number	Name	Function	Parameter range	Factory value											
90	Reached torque difference	<p>1. When the motor torque exceeds this parameter, the ATRQ (torque arrival) of the digital output DO is ON, otherwise it is OFF.</p> <p>2. The comparator has a hysteresis function, which is set by parameter PA90.</p> <p>3. With polarity setting function:</p> <table border="1"> <thead> <tr> <th>PA88</th> <th>PA28</th> <th>Comparator</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>>0</td> <td>Speed regardless of direction</td> </tr> <tr> <td rowspan="2">1</td> <td>>0</td> <td>Only positive torque is detected</td> </tr> <tr> <td><0</td> <td>Only the reversal speed is detected</td> </tr> </tbody> </table>	PA88	PA28	Comparator	0	>0	Speed regardless of direction	1	>0	Only positive torque is detected	<0	Only the reversal speed is detected	0-300%	5
PA88	PA28	Comparator													
0	>0	Speed regardless of direction													
1	>0	Only positive torque is detected													
	<0	Only the reversal speed is detected													
91	Reached torque polarity	<p>1. When the motor torque exceeds this parameter, the ATRQ (torque arrival) of the digital output DO is ON, otherwise it is OFF.</p> <p>2. The comparator has a hysteresis function, which is set by parameter PA90.</p> <p>3. With polarity setting function:</p> <table border="1"> <thead> <tr> <th>PA88</th> <th>PA28</th> <th>Comparator</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>>0</td> <td>Speed regardless of direction</td> </tr> <tr> <td rowspan="2">1</td> <td>>0</td> <td>Only positive torque is detected</td> </tr> <tr> <td><0</td> <td>Only reverse torque is detected</td> </tr> </tbody> </table>	PA88	PA28	Comparator	0	>0	Speed regardless of direction	1	>0	Only positive torque is detected	<0	Only reverse torque is detected	0-1	0
PA88	PA28	Comparator													
0	>0	Speed regardless of direction													
1	>0	Only positive torque is detected													
	<0	Only reverse torque is detected													
92	Zero speed detection hysteresis	<p>1. When the motor speed is lower than this parameter, the digital output DO's ZSP (zero speed) ON, otherwise OFF.</p> <p>2. The comparator has a return function.</p>	0-1000 r/min	5											
94	Delay time of electromagnetic brake opening	1. Set the delay time for the electromagnetic brake to open.	0-200 ms	0											

Serial number	Name	Function	Parameter range	Factory value
94	Command direction signal effective level	Set as: 0: High level positive direction; 1: Low level positive direction.	0-1	0
95	Motor encoder resolution	Encoder resolution, default to 2 of the 17 times square - 131072, set the value of 17, please modify carefully, otherwise the wrong setting will lead to flying cars.	10-32	17
96	Number of motor pole pairs	This parameter represents the motor pole pair. Please modify it carefully, otherwise the wrong setting will cause the flying car.	1-360	5
97	Motor zero offset angle	The zero-bit bias angle of the encoder and the motor is determined by the motor.	0-3600	216
99	Maximum duty cycle position ring when braking	Maximum duty ratio setting when braking.	5-90	50
100	Filter selection position loop	Set to: 0: Digital moving average filter; 1: Exponential smoothing filter.	0-1	0
101	Feedforward gain	Feed forward reduces the position tracking error when position control is set to 100, and the position tracking error is always 0 under the command pulse at any frequency.	0-100	0
102	Position loop feedforward filter time constant	Position ring feed filtering to increase the stability of the feed-forward control.	20-500	100
103	Z Signal Output Pulse Width	Z Signal Output Pulse Width	1-200	50
104	RS Output Function Selection	To set: 0: It can use RS485 communication function. 1: No RS485 communication function, but it can add a programmable output port which can output differential signal(Z signal as default).	0-1	0

7.2 P3 Group Parameters For Multifunctional Terminals

7.2.1 Parameter Table

P series servo drives have 4 input terminals and 4 output terminals. The definition values can be set by P3 group parameters. (Low level is effective as default for input terminals).

Parameter	Name	Range	Factory value
P3-0	Digital input DI1 function	0-99	1
P3-1	Digital input DI2 function	0-99	2
P3-2	Digital input DI3 function	0-99	3
P3-3	Digital input DI4 function	0-99	4
P3-15	Digital input DI forced effective 1	00000000-11111111	00000000
P3-16	Digital input DI forced effective 2	00000000-11111111	00000000
P3-17	Digital input DI forced effective 3	00000000-11111111	00000000
P3-18	Digital input DI forced effective 4	00000000-11111111	00000000
P3-19	Digital input DI forced effective 5	00000000-11111111	00000000
P3-20	Digital output DO1 function	0-99	2
P3-21	Digital output DO1 function	0-99	3
P3-22	Digital output DO1 function	0-99	5
P3-23	Digital output DO1 function	0-99	8
P3-30	Virtual input terminal control	0-2	0
P3-31	Virtual input terminal status value	00000000-11111111	00000000
P3-32	Virtual output terminal control	0-1	0
P3-33	Virtual output terminal status value	0000-1111	0000
P3-23	Virtual IO input DI1 function	0-99	5
P3-38	Virtual IO input DI2 function	0-99	6
P3-39	Virtual IO input DI3 function	0-99	7
P3-40	Virtual IO input DI4 function	0-99	8
P3-41	Virtual IO input DI5 function	0-99	9
P3-42	Virtual IO input DI6 function	0-99	10
P3-43	Virtual IO input DI6 function	0-99	11

Parameter	Name	Range	Factory value
P3-44	Virtual IO input DI7 function	0-99	11
P3-45	Virtual IO input DI8 function	0-99	12

NOTE:

- When P3-30 is 0, the IO input is determined by DI1 to DI4 to enter the number of IOs for 4, corresponding to the parameter p3-0 to P3-3;
- P3-30 s 1, IO input by the virtual IOP3-31 corresponding bits to determine the number of input IOs for 8, corresponding parameters P3-38 to P3-45;
- P3-30-2, the IO input is determined by DI1 to DI4 and P3-31, the number of IOs is 12, corresponding to parameters P3-0 to P3-3 and P3-38 to P3-45.

7.2.2 DI Function Explanation

The input terminals (four terminals correspond to P3 group parameters are P3-0, P3-1, P3-2, P3-3) define the values.

Define the value	Symbol	Function	Functional resolution
0	NULL	No function	The input status has no effect on the system.
1	SON	Servo enablement	The servo enables the input terminals. OFF: Servo driver can not be used, the motor does not current; ON: Servo driver enables the motor to switch on current.
2	ARST	Alarm cleared	Alarm clear input terminal: When there is an alarm, if the alarm allows to clear, enter the rising edge (OFF changes ON moments) to clear the alarm. Note: Only some alarms are allowed to clear.
3	CCWL	Forward drive prohibited	1. CCW drive prohibited input terminal: OFF: Prohibit forward rotation (CCW) rotation; ON: Allow forward rotation (CCW) rotation. 2. Used for mechanical limit travel protection, the function is controlled by parameter PA-20. Note that the default value of PA-20 ignores

Define the value	Symbol	Function	Functional resolution
3	CCWL	Forward drive prohibited	<p>this function. If you need to enable this function, you need to modify PA-20:</p> <ul style="list-style-type: none"> ❶ When PA-20 is 0, the function of input prohibition is valid, and whether CCW is prohibited is controlled by PA-83; ❷ When PA-20 is 1, the input prohibition function is invalid, and whether CCW prohibition is not controlled by PA-83. <p>3. When the prohibition function is valid (PA-20 is 0):</p> <ul style="list-style-type: none"> ❶ When PA-83 is 0, the forward torque is limited to 0, and the forward pulse input is not limited; ❷ When PA-83 is 1, the input of forward pulse is prohibited.
4	CWL	Reverse drive prohibition	<p>1. CW drive prohibited input terminal: OFF: Prohibit forward rotation (CW) rotation; ON: Allow forward rotation (CW) rotation.</p> <p>2. Used for mechanical limit travel protection, the function is controlled by parameter PA-20. Note that the default value of PA-20 is to ignore this function, if you need to enable this function, you need to modify PA-20:</p> <ul style="list-style-type: none"> ❶ When PA-20 is 0, the function of input prohibition is valid, and whether CW is prohibited is controlled by PA-83; ❷ When PA-20 is 1, the function of input prohibition is invalid, and whether CW is prohibited is not controlled by PA-83. <p>3. When the prohibition function is valid (PA-20 is 0):</p> <ul style="list-style-type: none"> ❶ When PA-83 is 0, the reverse torque is limited to 0, and the reverse pulse input is not limited; ❷ When PA-83 is 1, the input of reverse pulse is prohibited.

Define the value	Symbol	Function	Functional resolution
5	TCCW	Forward torque limit	<p>OFF: CCW direction torque is not limited by PA-36 parameter;</p> <p>ON: The torque in the CCW direction is limited by the PA-36 parameter.</p> <p>Note: Regardless of whether TCCW is valid or invalid, the torque in the CCW direction is still limited by parameter PA-34.</p>
6	TCW	Reverse torque limit	<p>OFF: CW direction torque is not limited by PA-37 parameter;</p> <p>ON: CW direction torque is limited by PA-37 parameter.</p> <p>Note: No matter whether TCW is valid or invalid, the torque in CW direction is still limited by parameter PA-35.</p>
7	ZCLAMP	Zero speed clamp	<p>When the following conditions are met, the zero-speed clamp function is turned on (the speed is forced to zero):</p> <p>Condition 1: Speed control mode (PA4=1), when external speed is selected (PA22=0);</p> <p>Condition 2: ZCLAMP ON;</p> <p>Condition 3: The speed command is lower than the parameter PA-75.</p> <p>When any of the above conditions are not met, normal speed control is executed.</p>
8	CZERO	Zero instruction	<p>Under speed or torque control, the speed or torque commands are respectively:</p> <p>OFF: normal command;</p> <p>ON: Zero command.</p>
9	CINV	Inverted instruction	<p>Under speed or torque control, the speed or torque commands are respectively:</p> <p>OFF: normal command;</p> <p>ON: The command is reversed.</p>

Define the value	Symbol	Function	Functional resolution
10	SP1	Speed selection 1	Under speed control (PA4-1), when selecting the internal speed (PA22=1), SP1 and SP2 are combined to select different internal speeds: SP2-OFF SP1-OFF: Internal Speed 1 (parameter PA-24)
11	SP2	Speed selection 2	SP2-OFF SP1-ON: Internal Speed 2 (parameter PA-25) SP2-ON SP1-OFF: Internal Speed 3 (parameter PA-26) SP2-ON SP1-ON: Internal Speed 4 (parameter PA-27)
13	TRQ1	Torque selection 1	Under torque control mode (PA4-2), when selecting the internal torque (PA32-1), the TRQ1, TRQ2 combination selects different internal torques: TRQ2-OFF TRQ1-OFF: Internal Torque 1 (parameter PA-64)
14	TRQ2	Torque selection 2	TRQ2-OFF TRQ1-ON: Internal Torque 2 (parameter PA-65) TRQ2-ON TRQ1-OFF: Internal Torque 3 (parameter PA-66) TRQ2-ON TRQ1-ON: Internal Torque 4 (parameter PA-67)
16	CMODE	Multi-mode control mode setting	When the PA-4 is set to 3,4,5, it is in mixed control mode, which allows you to switch control modes through this input terminal: (1) When PA-4 is 3, CMODE OFF is position mode, and CMODE ON is speed mode; (2) When PA-4 is 4, CMODE OFF is position mode and CMODE ON is torque mode; (3) When the PA-4 is 5, CMODE OFF is speed mode and CMODE ON is torque mode.

Define the value	Symbol	Function	Functional resolution
18	GEAR1	Electronic gear selection 1	When PA-11 is 0, the combination of GEAR1 and GEAR2 is used to select the numerator of different electronic gear ratios: GEAR2=OFF GEAR1=OFF: numerator 1 (parameter PA-12) GEAR2=OFF GEAR1=ON: numerator 2 (parameter PA-77) GEAR2=ON GEAR1= OFF: numerator 3 (parameter PA-78) GEAR2=ON GEAR1=ON: numerator 4 (parameter PA-79)
19	GEAR2	Electronic gear selection 2	
20	CLR	Position deviation clear	In position control mode, the position deviation counter zeros the input terminals.
21	INH	Pulse input prohibited	In position control mode, the position command pulse prohibits terminals: OFF: the command pulse input is valid; ON: The command pulse input is prohibited.
22	JOGP	Positive inching	In speed mode, when PA22 is 5, the signal is switched on, the motor is moving in the positive direction, and the speed is set by Pa21. Note: This signal is switched on at the same time as the reverse inch motion, and the inch action function is not valid.
23	JOGN	Reverse Inching	In speed mode, and PA22 is 5, this signal is switched on, the motor is moving in the opposite direction, and the speed is set by Pa21. Note: This signal is switched on at the same time as the forward inch movement, and the inch movement function is not valid.
27	HOLD	Internal position control command stop	When the internal position register mode is on, the signal is switched on and the motor will stop running (only in the internal position mode PA-14-3).

Define the value	Symbol	Function	Functional resolution																																																														
28	CTRG	Internal position command trigger	In the internal position register mode, when the internal position register control command (POS0-2) is selected, the signal is triggered and the motor operates according to the internal position register command. The next trigger internal position command is accepted when the digital output of a zero speed signal (ZSPD=1).																																																														
29	POS0	Internal position command selection 0	Corresponding relationship of internal location selection: <table border="1"> <thead> <tr> <th>location command</th> <th>POS2</th> <th>POS1</th> <th>POS0</th> <th>CTRG</th> <th>corresponding parameter</th> </tr> </thead> <tbody> <tr> <td rowspan="2">P1</td> <td rowspan="2">0</td> <td rowspan="2">0</td> <td rowspan="2">0</td> <td rowspan="2">↑</td> <td>P4-2</td> </tr> <tr> <td>P4-3</td> </tr> <tr> <td rowspan="2">P2</td> <td rowspan="2">0</td> <td rowspan="2">0</td> <td rowspan="2">1</td> <td rowspan="2">↑</td> <td>P4-5</td> </tr> <tr> <td>P4-6</td> </tr> <tr> <td rowspan="2">P3</td> <td rowspan="2">0</td> <td rowspan="2">1</td> <td rowspan="2">0</td> <td rowspan="2">↑</td> <td>P4-8</td> </tr> <tr> <td>P4-9</td> </tr> <tr> <td rowspan="2">P4</td> <td rowspan="2">0</td> <td rowspan="2">1</td> <td rowspan="2">1</td> <td rowspan="2">↑</td> <td>P4-11</td> </tr> <tr> <td>P4-12</td> </tr> <tr> <td rowspan="2">P5</td> <td rowspan="2">1</td> <td rowspan="2">0</td> <td rowspan="2">0</td> <td rowspan="2">↑</td> <td>P4-14</td> </tr> <tr> <td>P4-15</td> </tr> <tr> <td rowspan="2">P6</td> <td rowspan="2">1</td> <td rowspan="2">0</td> <td rowspan="2">1</td> <td rowspan="2">↑</td> <td>P4-17</td> </tr> <tr> <td>P4-18</td> </tr> <tr> <td rowspan="2">P7</td> <td rowspan="2">1</td> <td rowspan="2">1</td> <td rowspan="2">0</td> <td rowspan="2">↑</td> <td>P4-20</td> </tr> <tr> <td>P4-21</td> </tr> <tr> <td rowspan="2">P8</td> <td rowspan="2">1</td> <td rowspan="2">1</td> <td rowspan="2">1</td> <td rowspan="2">↑</td> <td>P4-23</td> </tr> <tr> <td>P4-24</td> </tr> </tbody> </table>	location command	POS2	POS1	POS0	CTRG	corresponding parameter	P1	0	0	0	↑	P4-2	P4-3	P2	0	0	1	↑	P4-5	P4-6	P3	0	1	0	↑	P4-8	P4-9	P4	0	1	1	↑	P4-11	P4-12	P5	1	0	0	↑	P4-14	P4-15	P6	1	0	1	↑	P4-17	P4-18	P7	1	1	0	↑	P4-20	P4-21	P8	1	1	1	↑	P4-23	P4-24
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P8	1	1	1	↑	P4-23																																																												
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30	POS1	Internal position command selection 1																																																															
31	POS2	Internal position command selection 2																																																															
33	SHOM	Start home return	In internal position register mode, the origin needs to be searched and the search origin function is activated when this signal is switched on (refer to the settings of P4-34).																																																														
34	ORGP	Return to the origin	In internal position register mode, when searching for the origin, the servo takes the location of this point as the origin when the signal is switched on (refer to the setting of parameter P4-32).																																																														

7.2.3 DO Function Explanation

Definition values of output terminals (4 terminals corresponding to P3 group parameters are P3-20, P3-21, P3-22, P3-23):

Define the value	Symbol	Function	Functional resolution
1	ON	Always effective	Force output ON.
2	RDY	Servo ready	OFF: Servo main power supply is not closed or has an alarm; ON: Servo main power supply is OK, no alarm.
3	ALM	Call the police	OFF: Alarms; ON: No alarm.
4	ZSP	Zero speed	Speed and torque control, OFF: Motor speed is higher than parameter PA-75 (regardless of direction); ON: The motor speed is lower than the parameter PA-75 (regardless of direction).
5	COIN	Positioning completed	When position control is in place, OFF: The position deviation is greater than the parameter PA-16; ON: The position deviation is less than the parameter PA-16.
6	ASP	Speed reached	Speed and torque control, OFF: Motor speed is lower than parameter PA-28; ON: The motor speed is higher than the parameter PA-28. With polarity setting function, refer to the description of parameter PA-28.
7	ATRQ	Torque reached	OFF: The motor torque is lower than the parameter PA-89; ON: The motor torque is higher than the parameter PA-89. With polarity settings, refer to the description of parameter PA-89.
8	BRK	Electromagnetic brake	OFF: electromagnetic brake; ON: Electromagnetic brake release.

Define the value	Symbol	Function	Functional resolution
9	RUN	Servo running	OFF: Servo motor is not powered on; ON: The servo motor is powered on.
10	NEAR	Positioning close	When position control is in place, OFF: The position deviation is greater than the parameter PA-85; ON: Position deviation small residual parameter PA-85.
11	TRQL	Torque limit	OFF: the motor torque does not reach the limit value; ON: The motor torque reaches the limit. The torque limit method is passed by parameters PA-34, PA-35, PA-36, PA-37.
12	SPL	Speed limit	When torque is controlled, OFF: the motor speed does not reach the limit value; ON: Motor speed reaches the limit. The speed limit method is set by parameter PA-50.
13	VCOIN	Consistent speed	OFF: The absolute value of the difference between the actual speed and the command speed is greater than Pa76; ON: The absolute difference between the actual speed and the command speed is less than Pa76.
15	HOME	Return to origin completed	OFF: No signal is output when origin regression is not completed; ON: Signal output when origin regression is complete.
16	CMDOK	Internal position command completed	OFF: Do not output a signal when the internal position command is not completed or the internal location command is not stopped; ON: When the internal position command is complete or the internal position command is stopped, the signal is output after P4-1 set time.

7.2.4 DI Forced Valid

There are five parameters in the P3 group (P3-15, P3-16, P3-17, P3-18, P3-19) that can be set to be digital input DI forced valid.

- ① There are five parameters in the P3 group (P3-15, P3-16, P3-17, P3-18, P3-19) that can be set to be digital input DI forced valid.

Digit	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Function	CZERO	ZCLAMP	TCW	TCCW	CWL	CCWL	ARST	SON

- ② The corresponding function of P3-16 is represented by 8-bit binary:

Digit	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Function	CMODE	NULL	TRQ2	TRQ1	NULL	SP2	SP1	CINV

- ③ The corresponding function of P3-17 is represented by 8-bit binary:

Digit	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Function	NULL	JOGN	JOGP	INH	CLR	GEAR2	GEAR1	NULL

- ④ The corresponding function of P3-18 is represented by 8-bit binary:

Digit	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Function	NULL	POS2	POS1	POS0	CTRG	HOLD	NULL	NULL

- ⑤ The corresponding function of P3-19 is represented by 8-bit binary:

Digit	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Function	NULL	NULL	NULL	NULL	NULL	NULL	ORGP	SHOM

Parameter meaning:

There are five parameters in the P3 group (P3-15, P3-16, P3-17, P3-18, P3-19) that can be set to be digital input DI forced valid.

Any one of the five parameters	Corresponding function	Functional result
0	Not planned	OFF (invalid)
	Planned	Determined by the signal
1	Unplanned or planned	ON (forced valid)

NOTE:

- Planned means that the parameter has been selected by the input terminals in P3-0~P3-3. If it is not planned, the opposite is true.

7.3 P4 Group Parameters For Internal Position Command

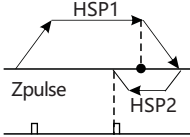
Serial number	Name	Function	Parameter range	Factory value
P4-0	Internal position command control mode	0: Absolute position command; 1: Incremental position command.	0-1	0
P4-1	Internal position command completion digital output delay	1. When the internal position command is completed or the internal position command is stopped, after the delay time set in P4-1, the internal position command complete (CMDOK) DO signal is output. 2. When the P4-1 delay time is set to 0, when the DO signal zero speed detection (ZSPD) is set to 1, the internal position command of the trigger signal is accepted again. 3. When the P4-1 delay time is not set to 0, it is set to 1 when the internal position command of the DO signal is completed (CMDOK), and then the internal position command triggered by the DI signal command trigger (CTRG) is accepted.	0-200ms	0
P4-2	Setting of position circle number of internal position command 1	Sets the number of positional laps for the internal position of paragraph 1.	-30000-30000	0

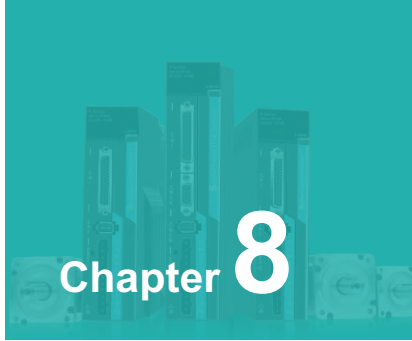
Serial number	Name	Function	Parameter range	Factory value
P4-3	Setting of the number of pulses in the position circle of the internal position command 1	1. Set the number of position pulses for the internal position of the first segment. 2. The internal position command 1 = the set value of the number of turns of the internal position of the first stage + the set value of the number of pulses of the internal position of the first stage. (Max is the set number of pulses per revolution of the motor, please refer to the setting of PA-11, PA-12, and PA-13).	+/- max.cnt/ rev	0
P4-4	Movement speed setting of internal position command control 1	Set the internal position command to control the speed of movement of 1.	0-5000 r/min	1000
P4-5	Setting of position circle number of internal position command 2	Sets the number of positional laps in the internal position of paragraph 2.	-30000- 30000	0
P4-6	Setting of the number of pulses in the position circle of the internal position command 2	1.Set the number of position pulses for the internal position of the second segment. 2.The internal position command 2=the set value of the number of turns of the internal position of the second stage + the set value of the number of pulses of the internal position of the second stage.	+/- max.cnt/ rev	0
P4-7	Movement speed setting of internal position command control 2	Set the internal position command to control the speed of movement of 2.	0-5000 r/min	1000
P4-8	Setting of position circle number of internal position command 3	Set the number of positional laps for the internal position of paragraph 3.	-30000- 30000	0
P4-9	Setting of the number of pulses in the position circle of the internal position command 3	1. Set the number of position pulses for the internal position of the third segment.	+/- max.cnt/ rev	0

Serial number	Name	Function	Parameter range	Factory value
P4-9	Setting of the number of pulses in the position circle of the internal position command 3	2. The internal position command 3 = the set value of the number of turns of the internal position of the third stage + the set value of the number of pulses of the internal position of the third stage.	+/- max.cnt/ rev	0
P4-10	Movement speed setting of internal position command control 3	Set the internal position command to control the movement speed of 3.	0-5000 r/min	1000
P4-11	Setting of position circle number of internal position command 4	Sets the number of position laps in the internal position of paragraph 4.	-30000- 30000	0
P4-12	Setting of the number of pulses in the position circle of the internal position command 4	1.Sets the number of position pulses at the internal position of segment 4. 2.Internal position instruction 4 - The internal positional number of revolutions in paragraph 4 is set and the internal position pulse setting in paragraph 4 is set.	+/- max.cnt/ rev	0
P4-13	Movement speed setting of internal position command control 4	Set the movement speed of the internal position command control 4.	0-5000 r/min	1000
P4-14	Setting of position circle number of internal position command 5	Set the number of positional laps for the internal position of paragraph 5.	-30000- 30000	0
P4-15	Setting of the number of pulses in the position circle of the internal position command 5	1.Sets the number of position pulses at the internal position of segment 5. 2.Internal position instruction 5 - The internal positional number of revolutions in the 5th paragraph is set.	+/- max.cnt/ rev	0
P4-16	Internal position command control 5 movement speed setting	Set the internal position command to control the speed of movement of 5.	0-5000 r/min	1000

Serial number	Name	Function	Parameter range	Factory value
P4-17	Setting of position circle number of internal position command 6	Sets the number of positional laps for the internal position of paragraph 6.	-30000-30000	0
P4-18	Setting the number of pulses in the position circle of internal position command 6	1.Sets the number of position pulses at the internal position of segment 6. 2.Internal position instruction 6 - The internal positional number set value of paragraph 6 and the internal position pulse setting value of paragraph 6.	+/- max.cnt/ rev	0
P4-19	Internal position command control 6 movement speed setting	Set the internal position command to control the movement speed of 6.	0-5000 r/min	1000
P4-20	Setting of position circle number of internal position command 7	Sets the number of position laps for the internal position of paragraph 7.	-30000-30000	0
P4-21	The number of pulses in the position circle of the internal position command 7 is set	1.Sets the number of position pulses at the internal position of segment 7. 2.Internal position instruction 7 - The internal position number set value of paragraph 7 and the internal position pulse setting value of paragraph 7.	+/- max.cnt/ rev	0
P4-22	Internal position command control 7 movement speed setting	Set the internal position command to control the speed of movement of 7.	0-5000 r/min	1000
P4-23	Setting of position circle number of internal position command 8	Sets the number of positional laps for the internal position of paragraph 8.	-30000-30000	0
P4-24	Setting of pulse number in position circle of internal position command 8	1.Sets the number of position pulses at the internal position of paragraph 8. 2.Internal Position Directive 8 - The internal positional number of revolutions in paragraph 8 is set , and the internal position pulse setting in paragraph 8 is set.	+/- max.cnt/ rev	0

Serial number	Name	Function	Parameter range	Factory value
P4-25	Internal position command control 8 moving speed setting	Set the internal position command to control the speed of movement of 8.	0-5000 r/min	1000
P4-32	Origin detector type and search direction setting	0: forward direction origin regression, CCWL as regression origin; 1: Reverse direction origin regression, CWL as regression origin; 2: Forward direction origin regression, ORGP as regression origin; 3: Reverse direction origin regression, ORGP as regression origin; 4: turn directly to find the absolute position of the single circle zero point for the regression origin; 5: Reverse directly looking for the absolute position zero of the lap is the regression origin.	0-5	0
P4-33	Short-distance movement method setting to reach the origin	0: After finding the reference origin, return to find the single-turn absolute position zero point as the mechanical origin; 1: Do not return after finding the reference origin, look forward to the absolute position zero point of a single circle as the mechanical origin; 2: After finding the reference origin (ORGP rising edge or single-turn absolute position zero point) as the mechanical origin, decelerate to a stop.	0-2	0
P4-34	Origin trigger start mode	0: Turn off origin regression; 1: When the power is on, the origin regression function is automatically performed; 2: Trigger origin regression by the origin search function (SHOM) input contact.	0-2	0
P4-35	Origin stop mode setting	0: After the origin detection is completed, the motor slows down and pulls back to the origin; 1: After the origin detection is complete, the motor slows down in the forward direction and stops.	0-1	0

Serial number	Name	Function	Parameter range	Factory value
P4-36	The first stage of high-speed home return speed setting (HSPD1)	Set the first high-speed origin regression speed. 	1-2000 r/min	1000
P4-37	The second stage of low-speed home return speed setting (HSPD2)	Set the second low-speed origin regression speed.	1-500 r/min	50
P4-38	Home return offset circle number (HOF1)	Sets the number of origin regression offset circles.	-30000-30000	0
P4-39	Origin return offset pulse number (HOF2)	1.Sets the number of origin regression offset pulses. 2.When the parameter function HOF1, HOF2 is set to zero, the origin is defined as the absolute position zero or ORGP of the single circle according to the origin regression mode. If the set value is not zero, the origin will be based on the above-mentioned single-circle absolute position zero or ORGP plus a pulse offset HOF1 x 10000 plus HOF2 as the new origin.	+/- max.cnt/ rev	0



Chapter 8

Error Code

Fault symbol	Fault name	Fault content
–	normal	
1	Speeding	Servo motor speed exceeds the set value
2	Main circuit overvoltage	The main circuit power supply voltage is too high
3	Main circuit undervoltage	The main circuit power supply voltage is too low
4	Location is out of tolerance	The value of the position deviation counter exceeds the set value
5	Drive overheating	Drive temperature is too high
6	Speed amplifier saturation failure	Speed regulation is saturated for a long time
7	Drive prohibited exception	CCW/CW drive prohibition inputs are all OFF
8	Position deviation counter overflow	The absolute value of the position deviation count exceeds 230
11	IPM module failure	IPM smart module failure
13	Drive overload	Servo drive and motor overload (instantaneous overheating)
14	Brake failure	Brake circuit failure
18	Relay switch failure	The actual state of the relay is inconsistent with the control state
19	Brake delay error	Pulse input when the brake is not open
20	EEPROM error	EEPROM error
21	FPGA module failure	Abnormal function of FPGA module
23	Current acquisition circuit failure	Current acquisition circuit failure
29	User torque overload alarm	The motor load exceeds the value and duration set by the user
42	AC input voltage is too low	AC input voltage is too low
47	The main circuit voltage is too high when powering on	The main circuit voltage is too high when powering on
50	Encoder communication failure	The drive and the encoder have not established a communication connection
51	Encoder communication abnormal	After the encoder communication is established, the communication is interrupted and the connection is disconnected
52	Encoder battery voltage is low alarm	Encoder battery voltage is low and alarm, the information is not lost but needs to be replaced as soon as possible

Fault symbol	Fault name	Fault content
53	Encoder battery voltage error alarm	Encoder battery voltage error alarm, the stored information has been wrong, the encoder needs to be reset
54	Encoder error alarm	Encoder is not battery alarm, but the encoder needs to be reset
55	CRC check error 3 times in a row	The CRC of the data received by the encoder communication has errors for 3 consecutive times
56	MODBUS frame too long error	The received MODBUS frame data is too long
57	MODBUS communication format is abnormal	Improper communication parameter setting or incorrect address or value
58	Wrong lap position value	The single-turn position offset value stored by the drive exceeds the encoder resolution
59	Encoder reports CF error	The encoder continuously reports errors in the CF domain, and the encoder needs to be reset



Chapter 9

Communication Function

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9.1 Hardware

AC Servo Drive :

It has the serial communication function of RS-485 and it can realize parameter changes and status monitoring of servo system with MODBUS protocol.

9.2 Communication Parameters

Parameter	Name	Range	Default Value
PA-71	Drive ID No.	1~254	1

When using RS-485 communication, ID No. of the servo drive needs to be set to different values according to this parameter. The setting range of ID No. is from 1 to 254 and default value is 1. This ID No. represents the absolute address in communication network and if it is set repeatedly, it will lead to abnormal communication.

Parameter	Name	Range	Default Value
PA-72	MODBUS Baud Rate	48~1152×100	96

You can choose RS-485 baud rates through this parameter and the baud rate that you chose should keep consistent with PC controller's.

Parameter Meaning :

If selection is 96×100 , the baud rate is 9600.

Meanwhile, the communication protocol of RS-485 should be consistent with PC controller's

The setting values as below:

8 , N , 2 (MODBUS , RTU)

"8" represents the transmission data is 8 bits. "N" represents that it doesn't use odd or even bits."2" represents the ending bit is 2.

Parameter	Name	Range	Default Value
PA-73	MODBUS Communication Protocol Selection	0~2	0

You can choose communication protocol of RS-485 through this parameter and the communication protocol should be consistent with PC controller's. The setting values as below:

0 : 8 , N, 2 (MODBUS , RTU)

1 : 8 , E, 1 (MODBUS , RTU)

2 : 8 , O, 1 (MODBUS , RTU)

"8" represents the transmission data is 8 bits. "N,E,O" represents odd or even bit. While "N" represents it doesn't use this bit; "E" represents 1 even bit;"O" represents 1 odd bit;

"1" represents the ending bit is 1 and "2" represents the ending bit is 2.

9.3 MODBUS Communication Protocol

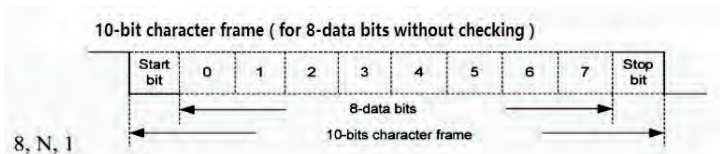
When using RS485 serial port communication, each servo drive must set servo drive ID in the parameter.

PC or controller should communicate with corresponding servo drive based on the ID No. And the baud rate need to set the parameters of the drive referring to the communicated parameters. Here, Modbus executes RTU(Remote Terminal Unit) mode.

Encoder Meaning

Each 8-bit data consists of two 4-bit hexadecimal characters. For example, 1 byte data 64H.

Character Structure:



Communication Data Structure:

STX	The minimum time between the upper frame is 3.5 characters.
ADR	Communication address:1byte
CMD	Commmand code: 1byte
DATA(0)	Drive temperature is too highData: Nword=2Nbyte, N <=100

DATA(n-1)	
CRC	Checking code: 2byte
End1	The minimum time between the next frame is 3.5 characters.

The introduction for each item in the frame of communication data format is as following:

1、STX(Start of communication)

The minimum time between the upper frame is 3.5 characters.

2、ADR(Communication address)

The legal communication ranges from 1 to 254. Fro example, communicate with the drive of ID NO.16(hexadecimal10H):ADR=10H

3、CMD(Command code) And DATA(Data characters)

The data characters are depended on the command codes. The normal command codes are as follows:

(1)Command code 03H , read N words(16bit).

For example, 2 parameters are continuously read from the NO.5 parameter of the ID NO.01H servo drive.

ADR	01H
CMD	03H
The initial location of data	00H(High byte)
	05H(Lower byte)
Data bytes	00H(High byte)
	02H(Lower byte)
CRC Low	D4H(High byte)
CRC High	0AH(Lower byte)

ADR	01H
CMD	03H
Data bytes	04H
No.5 parameter	00H(High byte)
	96H(Lower byte)
No.6 parameter	00H(High byte)
	4BH(Lower byte)
CRC Low	5AH(High byte)
CRC High	28H(Lower byte)

(2) Command code 06H, Write 1 parameter.

For example, Write 100(0064H) into the No.5 parameter of the ID NO.01H.

Command:

ADR	01H
CMD	06H
The initial location of data	00H(High byte)
	05H(Lower byte)
Data bytes	00H(High byte)
	02H(Lower byte)
CRC Low	D4H(High byte)
CRC High	0AH(Lower byte)

Response:

ADR	01H
CMD	06H
The initial location of data	00H(High byte)
	05H(Lower byte)
Data bytes	00H(High byte)
	02H(Lower byte)
CRC Low	D4H(High byte)
CRC High	0AH(Lower byte)

4、CRC Frame Checking Calculation:

The procedures of checking calculation:

Step 1: Initializes a 16-bit register with FFFFH, which named as CRC register.

Step 2: XOR(exclusive or data processing) is calculated between the first character of command information and the lower byte of 16-bit CRC register and then the result is stored in the CRC register.

Step 3: Check the lowest bit(LSB) of the CRC register. If it is 0, then move to the right one.

If it is 1, then move to the right one and after that, XOR(exclusive or data processing) operation is calculated with A001H.

Step 4: Back to step 3 and until the operation of step 3 has been executed for 8 times, you can enter into step 5.

Step 5: The next byte of command information is operated from step 2 to step 4 until all bytes have been processed completely as above, then the information of CRC register is CRC frame checking.

Note:

After calculating the CRC frame checking, must firstly fill in the lower bits of CRC and then fill in the high bits in the command information.

4、CRC Frame Checking Calculation:

The procedures of checking calculation:

Step 1: Initializes a 16-bit register with FFFFH, which named as CRC register.

Step 2: XOR(exclusive or data processing) is calculated between the first character of command information and the lower byte of 16-bit CRC register and then the result is stored in the CRC register.

Step 3: Check the lowest bit(LSB) of the CRC register. If it is 0, then move to the right one.

If it is 1, then move to the right one and after that, XOR(exclusive or data processing) operation is calculated with A001H.

Step 4: Back to step 3 and until the operation of step 3 has been executed for 8 times, you can enter into step 5.

Step 5: The next byte of command information is operated from step 2 to step 4 until all bytes have been processed completely as above, then the information of CRC register is CRC frame checking.

Note: After calculating the CRC frame checking, must firstly fill in the lower bits of CRC and then fill in the high bits in the command information.

For example, Continuously to read 2 parameters in the NO.5 parameter of the ID NO.01H servo drive. From ADR to the last byte of data, the final information of CRC register that was calculated is 0AD4H. Then the command information is as follows:

Note: ByteD4H should be served before the byte0AH.

ADR	01H
CMD	03H
The initial location of data	00H(High byte)
	05H(Lower byte)
Data bytes	00H(High byte)
	02H(Lower byte)
CRC Low	D4H(High byte)
CRC High	0AH(Lower byte)

5、Ending with End1 communication:

The minimum time between the next frame is 3.5 characters.

9.4 Write Parameters And Read Parameters

1、Write PA group parameters

PA group parameters of the servo drive refer to the chapter 6 of the servo manual.

Each parameter is represented by 16 bits and their communication address is determined by the parameter No..For example,parameter 1(PA-0) is 0X0000; Parameter 2(PA-1) is 0X0001 and other parameters are like this.

2、Write P3 group parameters

P3 group parameters of the servo drive refer to the chapter 6.2 of the servo manual.

Each parameter is represented by 16 bits and their communication address is determined by the parameter No..For example, parameter 1 (P3-0) is 0X0100H; Parameter 16(P3-15) is 0X010FH. Other parameters are deduced in turn.

3、Write P4 group parameters

P4 group parameters of the servo drive refer to the chapter 6.3 of the servo manual.

Each parameter is represented by 16 bits and their communication address is determined by the parameter No..For example, parameter 1 (P4-0) is 0X0200H; Parameter 16(P3-15) is 0X020FH. Other parameters are deduced in turn.

4、The format of writing parameters and reading parameters

The introduction of the format of writing parameters and reading parameters(standard volume reading refers to chapter 1.5):

The parameter must be a decimal integer. The values of parameters with decimal points displayed on the drive are amplified in the process of reading and writing, which leads to make them converted into decimal integer.

PA Group Parameters	Drive Display	Communication Operation	Transformed Mode
1	315	315	No
63	1.00	100	Magnify 100 times
57	0100(binary)	4(decimal)	Binary to decimal

The values of parameters in the manual can be read and wrote through communication.

The details refer to coresponding introductions of parameters in the manual.

9.5 Status Monitoring

The internal states in the servo drive can be read through the terminal of RS485 communication, but it can not be wrote. The states are saved as 16-bit data. And when values of parameters with decimal points are read by the communication terminal, they are amplified to 10 times or 100 times. This is like as the parameter reading. The order of status are as follows:

1000H	Display motor speed
1001H	Display the current position is 5-bit low
1002H	Display the current position is 5-bit high
1003H	Display position command(command pulse accumulation) is 5-bit low.
1004H	Display position command(command pulse accumulation) is 5-bit high.
1005H	Display position deviation is 5-bit low.
1006H	Display position deviation is 5-bit high .
1007H	Display motor torque
1008H	Display motor current
1009H	Display control mode
100AH	Display temperature
100BH	Display speed command
100CH	Display torque command
100DH	Display absolute position of the rotor in a roll is 5-bit low
100EH	Display absolute position of the rotor in a roll is 5-bit high .
100FH	Display input terminal state
1010H	Display output terminal state
1011H	Display encoder input signal
1012H	Display voltage value of main line of main circuit
1013H	Display alarm code
1014H	Display logic chip version number

9.6 The Temporary Storage Function And Temporary Storage Address

According to the needs of customers, it is necessary to update the parameter values continuously in the process of running the drive. In order to ensure the life of EEPROM and speed up the efficiency of program execution, the temporary storage function of parameters is added. When the parameter is modified with the corresponding temporary address, the parameter can be modified, but it can not be saved. When the drive is repowered on, the parameter will restore to the initial value. For example:


The address of the forward torque limit value is ensured to be 0x0022, when the parameter is modified to 200 with the address , it is saved in the EEPROM. The parameter is still 200 without lost after the drive is powered off. While the address of the temporary forward torque limit value is 0x00A2,when the parameter is modified to 200 with the address , the value is set in and will function immediately, but the initial value will be restored to 300 after repowering on.

The communication address of the saved parameters of the PA group parameters is described in the chapter of 1.4 and the parameter description part of the drive manual. The temporary communication addresses of PA group parameters are offset 0x0080 than the addresses of stored parameters, for example:

(1) The saved parameter communication address of the forward torque limit value is 0x0022, and the temporary parameter communication address of forward torque limit value is 0x00A 2 after offsetting 0x0080.

(2) The saved parameter communication address of the reverse torque limit value is 0x0023.After offsetting 0x0080, the temporary parameter communication address of the reverse torque limit value is 0x00A3.

9.7 Communication Wiring Definition

Rs485 Communication Signal		
Pin	Definition	Picture
4	Rs485-	Connect with No.4 and No.5 pin 
5	Rs485+	

WARRANTY

- ❶ The company solemnly promises that users will enjoy the following warranty services from the date of purchase of products from our company (hereinafter referred to as the manufacturer).
- ❷ Since the product was purchased by the user from the manufacturer, enjoy the following three guarantee services:
 - ✘ Return, replacement and repair within 30 days of delivery:
 - ✘ Replacement and repair within 90 days of delivery:
 - ✘ Repair within 18 months of delivery:
 - ✘ Except when exporting abroad.
- ❸ This product enjoys lifetime paid service from the date of purchase by the user from the manufacturer.
- ❹ Disclaimer: Product failure caused by the following reasons is not covered by the manufacturer's free warranty service:
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 - ✘ Failure caused by the user to repair or modify the product without communicating with the manufacturer:
 - ✘ Failure caused by abnormal aging of the product due to poor user environment:
 - ✘ Failures caused by natural disasters such as earthquakes, fires, floods or abnormal voltages:
 - ✘ Damage to the product during transportation (the transportation method is specified by the customer, and the company assists in handling the cargo consignment procedures)
- ❺ Under the following conditions, manufacturers have the right not to provide warranty services:
 - ✘ When the manufacturer's product logo, trademark, nameplate, etc. are damaged or unrecognizable:
 - ✘ When the user fails to pay the purchase price in accordance with the signed contract:
 - ✘ The user intentionally conceals the manufacturer's after-sales service unit when the product is installed, wired, operated, maintained or otherwise improperly used
- ❻ For the service of return, replacement and repair, the company must return or return to the company, and it can only be returned or repaired after confirming the responsibility vested.

WARRANTY CARD

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Machine type		Machine code	
Agent / Reseller Information			
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