ISD500H交流伺服
使用手册

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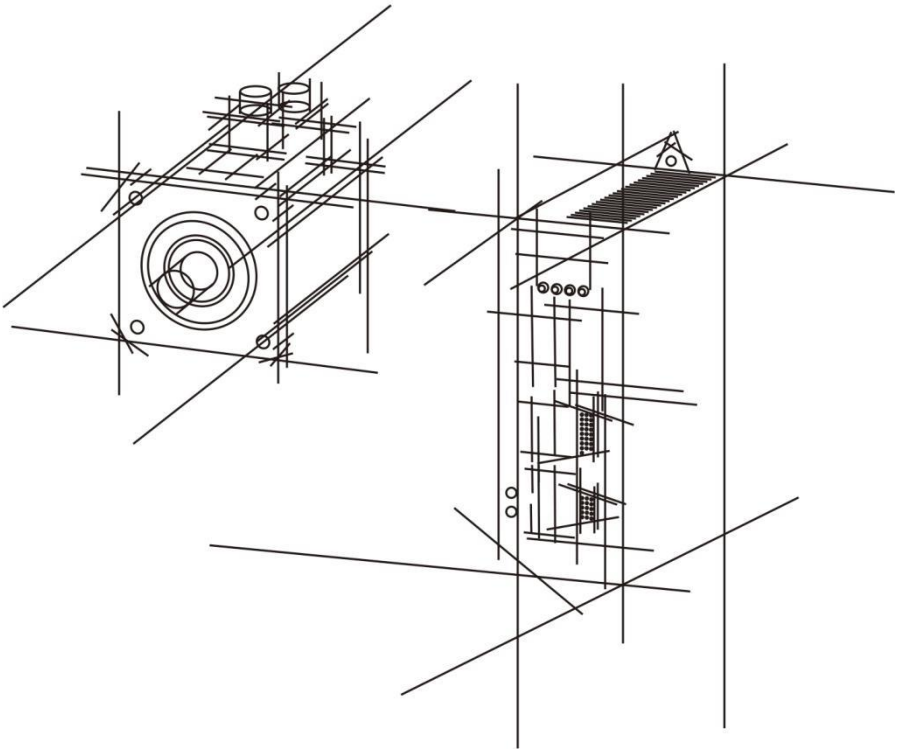
AC Servo Manual



Safety Caution

Before product storage, installation, wiring, operation, inspection or maintenance, the user must be familiar and comply with the following important matters to ensure to use the product safely .

 **Danger Misoperation would cause danger and personal injury.**

 **Attention Misoperation may cause danger, personal injury and damage the equipment.**

 **Prohibition Behavior is strictly prohibited, otherwise it will lead to equipment damage or can not be used.**

1.Application

 **Danger**
● Forbidden to use the product when it is exposed to water gas, corrosive gas and combustible gas. Or it could cause an electric shock or a fire. ● Forbidden to use products in places with more direct sunlight, dust, salt and metal powder. ● Forbidden to use products in places where water, oil and medicine are dripping.

2.Wiring

Danger

- Please ground the grounding terminal reliably. Poor grounding may cause electric shock or fire.
- The U,V,W motor output terminal and the motor wiring terminal must be connected one-to-one correspondence, otherwise the motor may cause equipment losing and casualties caused by the over speed vehicle.
- Please fasten the power supply and motor output terminals, otherwise it may cause fire.

3.Operation

Caution

- When the mechanical equipment starts operation, it must match proper parameters. If it does not adjust to the appropriate setting values, it may cause the mechanical equipment to lose controlling.
- Before starting operation, please confirm if you can start emergency switch shutdown at any time.
- Please test whether the servo motor is running normally without load firstly, and then connect the load to avoid unnecessary loss.
- Do not switch on and off power frequently, otherwise it will cause drive overheating.

4.Working

Prohibition

- When the motor is running, it is forbidden to touch any parts in rotation, otherwise it will cause casualties.
- When the equipment is running, it is forbidden to touch the driver and motor, otherwise it will cause electric shock or burns.
- When the equipment is in operation, it is forbidden to move connecting cables, otherwise it will cause injury to the person or damage to the equipment.

5. Maintenance and Inspection

Prohibition

- It is forbidden to touch the inside of the drive and its motor, otherwise it will cause electric shock.
- When the power supply is started, it is forbidden to disassemble the drive panel, otherwise it will cause electric shock.
- Do not touch the terminal blocks within 5 minutes of the power being 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 on, otherwise it will cause electric shock.

6.Range of Application

Caution

The products mentioned in this manual are for general industrial use, and should not be used on devices that may directly endanger personal safety.

CONTENT

Chapter 1Product Inspection And Installation

1.1 Product Inspection

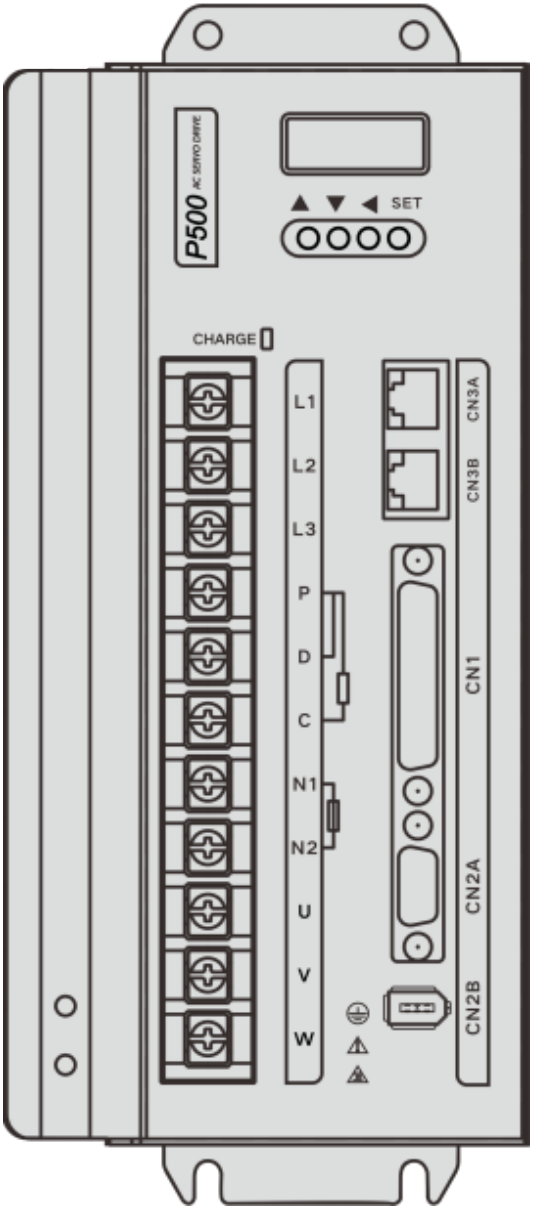
This product has made the complete function test before delivery. For prevented the product to be abnormal owing to shipping process, please make detail inspection as the following items after breaking the seal:

- Check that the servo drive and servo motor models are the same as those you ordered.
- Check whether the servo drive and servo motor are damaged and scratched during transportation. If damage is caused during transportation, do not connect cables.
- Check the servo drive and servo motor for loose components. Whether there are loose screws, whether the screws are not locked or come off.
- Check whether the rotor shaft of the servo motor can rotate smoothly by hand. A motor with a brake cannot be rotated directly.
- Check if the servo operating instructions are included.
- Check that the drive accessory is included in the box.

If there is any discrepancy, please contact the purchasing agents.

1.2 Product Front Panel

Applicable types：ISD500H



Pic 1.1 ISD500H Front Panel Introduction

Terminal	Introduction
L1,L2,L3	Power supply terminal for 3 phases 380 ~ 400 VAC
P,D,C	Regeneration resistance terminal
N1,N2	External DC reactor interface terminal
U,V,W	Servo motor UVW connection terminal
CN3A/CN3B	Communication terminal
CN1	Input and output control signal terminal
CHARGE	Bus voltage indicator. It is used to indicate the bus capacitance in a charged state. When the indicator lights on, even if the power supply is off, the internal capacitor of the servo unit may still have a charge. Therefore, do not touch the power terminal when the lights on to avoid electric shock.
CN2A	Encoder signal terminal for 2500ppr incremental encoder
CN2B	Encoder signal terminal for 17 bits absolute encoder

1.3 Product Installation

1.3.1 Servo Drive Installation

- 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.

- Installation interval

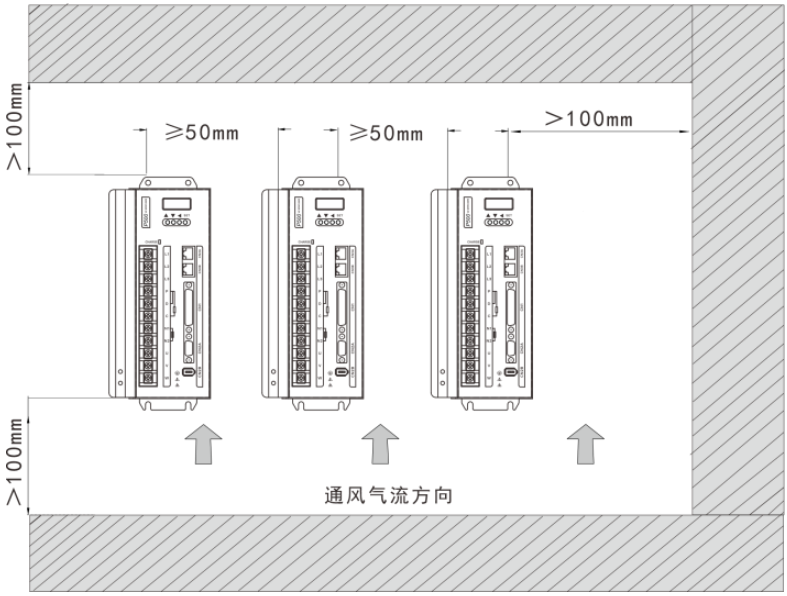
Refer to pic1.1 for the distance between drives and installation intervals with other devices,and please note that the picture indicates the smallest size, in order to ensure the performance and life of the drives, please leave the full installation interval as far as possible.

- 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.



Pic 1.2 Installation Interval

1.3.2 Environment Condition For Installation

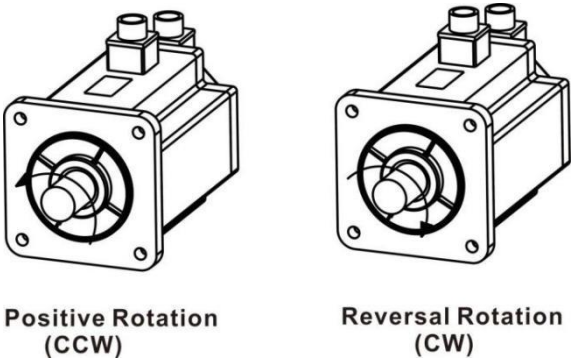
- Ambient temperature: 0 to 40℃; Ambient humidity: less than 80% (no condense).
- Storage temperature: -40 to 50℃; Storage humidity: less than 93% (no condense).
- Vibration: less than 0.5G.
- A well-ventilated place with less moisture and dust.
- No corrosive, ignition gas, oil and gas, cutting fluid, cutting powder, iron powder and other environments.
- A place free from water vapor and direct sunlight.

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 taken43 against entering inside of the servo motor by oil come from the speed reducer.
- The extension of the motor shaft should be sufficient, if the extension amount is insufficient, it will easily cause vibration when the motor is moving.
- 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.



Pic1.3 Motor Rotation Direction

Chapter 2 Servo Specifications

2.1 Servo Drive Specification

Model	ISD500H	
Power	3.5KW~7.5KW	
Main Circuit	3 phases AC 380 ~ 400 V , 50/60Hz	
Control Mode	0：Position. 1：Speed. 2：Torque. 3：Position and speed. 4：Position and torque. 5：Speed and torque	
Protection 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	Servo on , Alarm clearance ,CCW drive inhibition ,CW drive inhibition , Deviation counter clearance, Command pulse inhibition , CCW torque limit , CW torque limit and etc.	
Control Output	Servo ready/Servo alarm/Positioning completion/Mechanical braking	
Regeneration Braking	Built-in/ Built-out	
Load	Less than 300 % 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 phase orthogonal pulse
		3：Internal position control
	Electronic gear ratio	1-32767/1-32767

2.2 Servo Drive Naming Rule

ISD	500	H	- □□□
A	B	C	D

Serial No.	Definition
A	ISD series ac servo drive.
B	Power: 100：0.05KW~1KW / 200 : 1KW~2KW / 300 : 2KW~4.5KW。 500 : 3.5KW~7.5KW
C	H: High performance .
D	Customization.

2.3 Servo Motor Naming Rule

ISM	3 -	180	480	15	I2	- H	-	B
A	B	C	D	E	F	G		H

Serial No.	Definition
A	ISM : ISM Series of Servo Motors .
B	1 : 220V(3PH) / 2 : 220V(3PH) /3 : 380V(3PH) /
C	Flange:40(mm);60(mm);80(mm);130(mm);150(mm);180(mm)
D	Rated torque(×0.1Nm): 480 = 48Nm
E	Rated speed(×100rpm): 15=1500rpm
F	**A1**:17-bit multi-turn absolute. / **A6**:17-bit single turn absolute. **I2**: 2500ppr incremental encoder. / **A7**:17-bit single turn absolute.
G	Motor connector
H	B: with a brake, Null: without a brake.

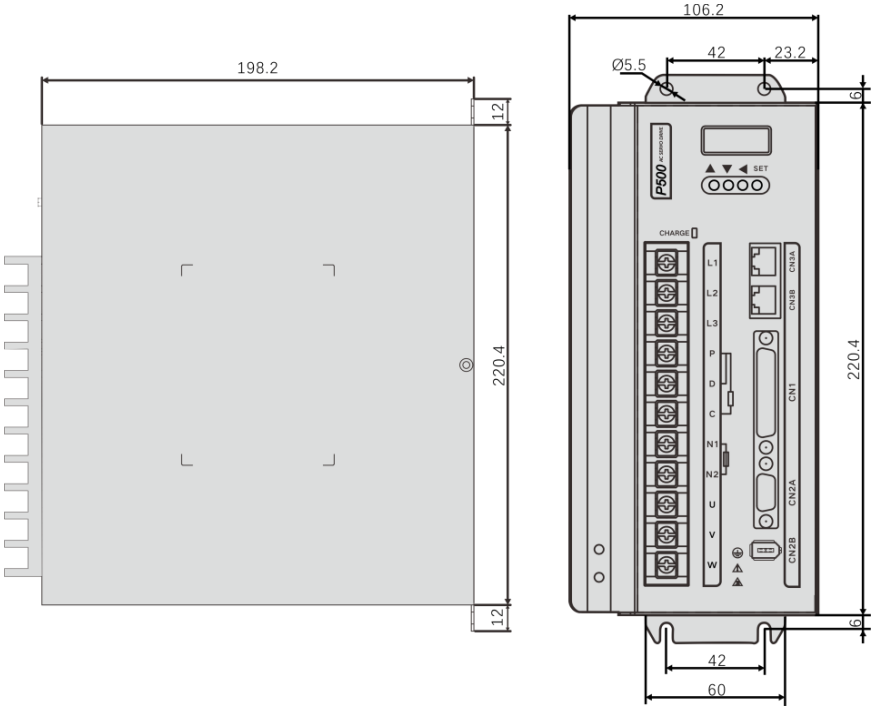
1. The code 02430 means the motor rated toque is 2.4N.m and rated speed is 3000rpm.
2. The rated power: P=0.1047×N×T=0.1047×2.4×3000=753.84W≈0.75KW.

2.5 380VAC Servo Motor And Matched Servo Drive List

Flange	Model	Power	Speed	Matched Drive	Encoder
180mm	ISM3-180-18615I2-H(B)	3000W	*1500rpm*	*ISD500H*	2500ppr incremental encoder
	ISM3-180-28415I2-H(B)	4500W	1500rpm		
	ISM3-180-35015I2-H(B)	5500W	1500rpm		
	ISM3-180-48015I2-H(B)	7500W	1500rpm		

Chapter 3 Drive Dimension

3.1 Drive Dimension

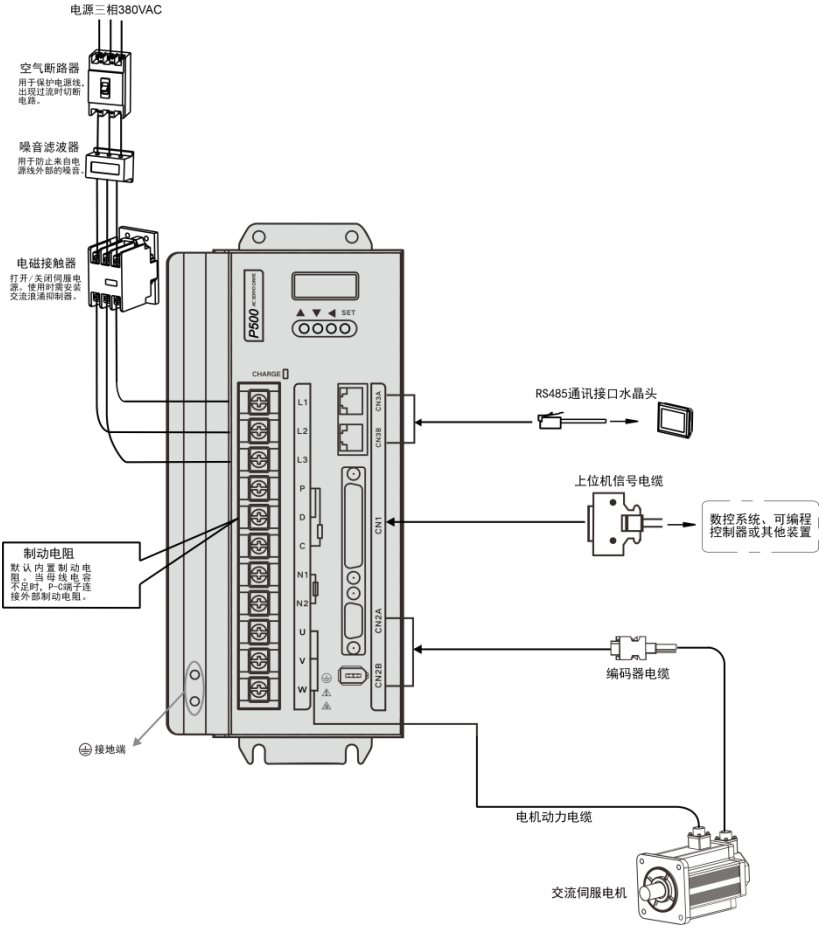


Pic 3.1 ISD500H Dimension

Chapter 4 Drive System Wiring And Introduction

4.1 Servo System Wiring

4.1.1 Servo Drive Wiring



Pic 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,L3 are correct.
- 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.
- As the servo motor flows through the high-frequency switch current, the leakage current is relatively large, and the motor grounding terminal must be connected with the servo driver grounding terminal PE and well grounded.
- The direction of the diode for absorbing the relay installed on the output signal shall be correct, otherwise it will cause a fault and cannot output the signal.
- To prevent false action caused by noise, please add insulation transformer, noise filter and other devices on the power supply.
- Please wire the power line (motor line, strong current circuit of power line, etc.) and signal line at a distance of over 30cm.Do not place in the same wiring conduit.
- Please install non-fusing circuit breaker to cut off external power timely in case of driver failure.
- Because there is a large capacity electrolytic capacitor inside the servo driver, even if the power supply is cut off, there is still high voltage in the internal circuit. After the power supply is cut off, the driver and the motor can be contacted at least 5 minutes later.

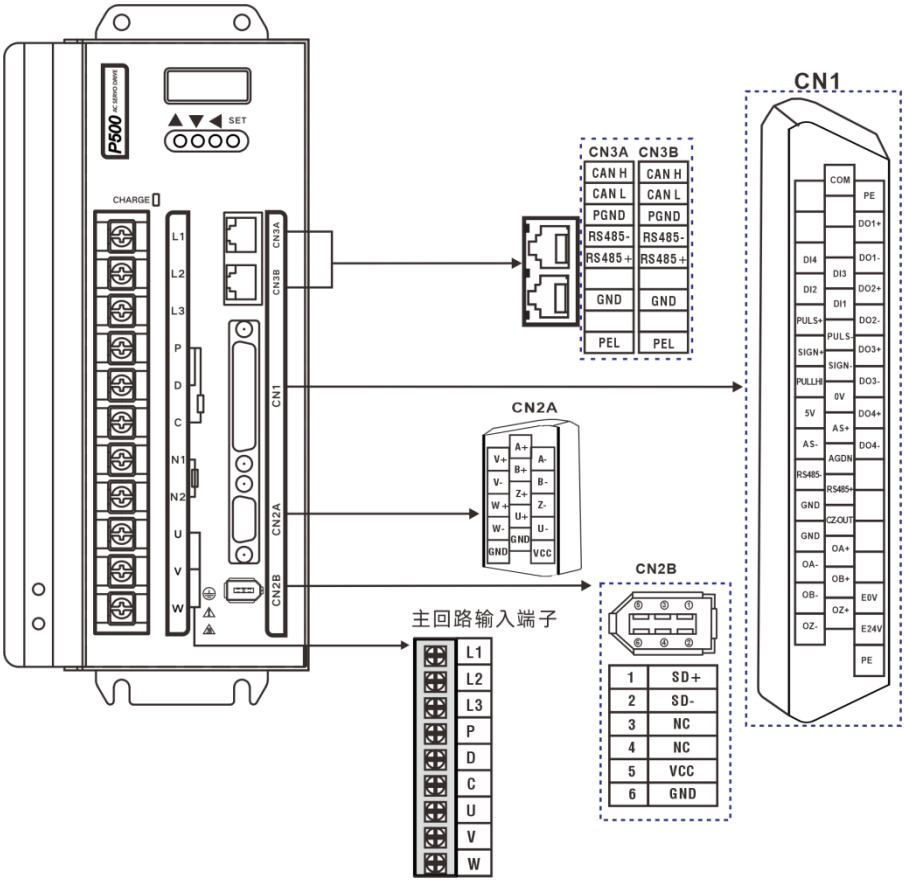
4.1.3 Electric Wire Specifications

Connect Terminal	Symbol	Wire Specification
Main Power Supply	L1、L2、L3	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	≧0.14mm^2(AWG26), Shielded.
Regenerative Resistors Terminals	P、D/P、C	1.5~4mm^2

◆ 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

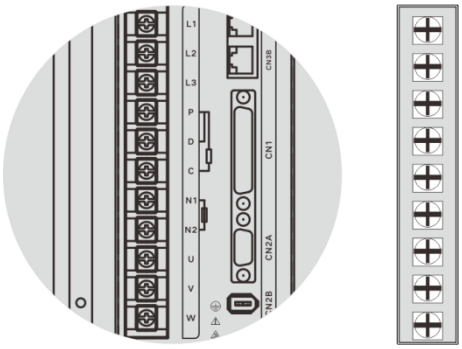
4.2 Servo driver terminals Introduction



◆ The above picture shows the pins arrangement of the drive.

4.3 Servo Driver Main Circuit Connection

4.3.1 Main Circuit Terminal Introduction



Pic 4.3 Main Circuit Terminal

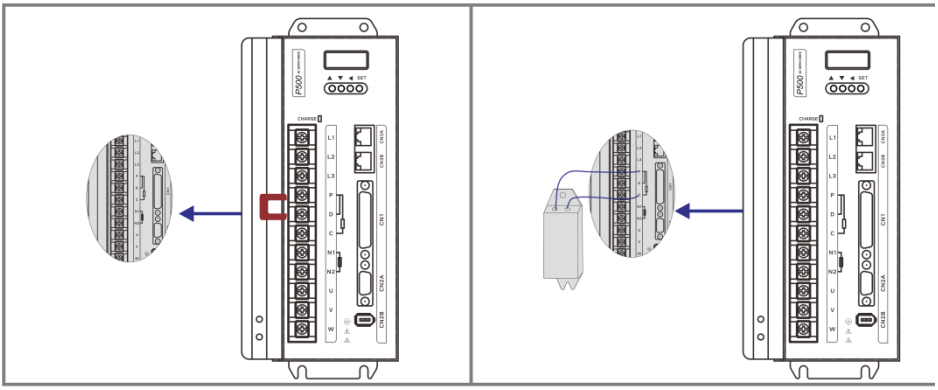
Terminal Name	Symbol	Detailed Explanation
Main Power Supply	L1、L2、L3	3 phases 380VAC -15%~+10%，50/60Hz.
Regenerative Resistance	P、D	When use the built-in resistor,please connect P and D.
	P、C	When the external regeneration resistance is required, please disconnect P and D and crossover it to terminal P and C. Leaving N disconnected.
Servo Motor	U、V、W	UVW 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 Brake Resistance Wiring Instructions

If the internal brake resistor is used, the driver should connect P and D in short circuit, i.e. it can be used normally according to the ex-factory state, as shown in Figure A. If an external brake resistor is used, the short circuit between P and D must be removed first, and then the external brake resistor shall be bridged on P and C, as shown in Figure B:



Pic A Pic B

Brake Resistance Wiring Precautions:

◆ 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.

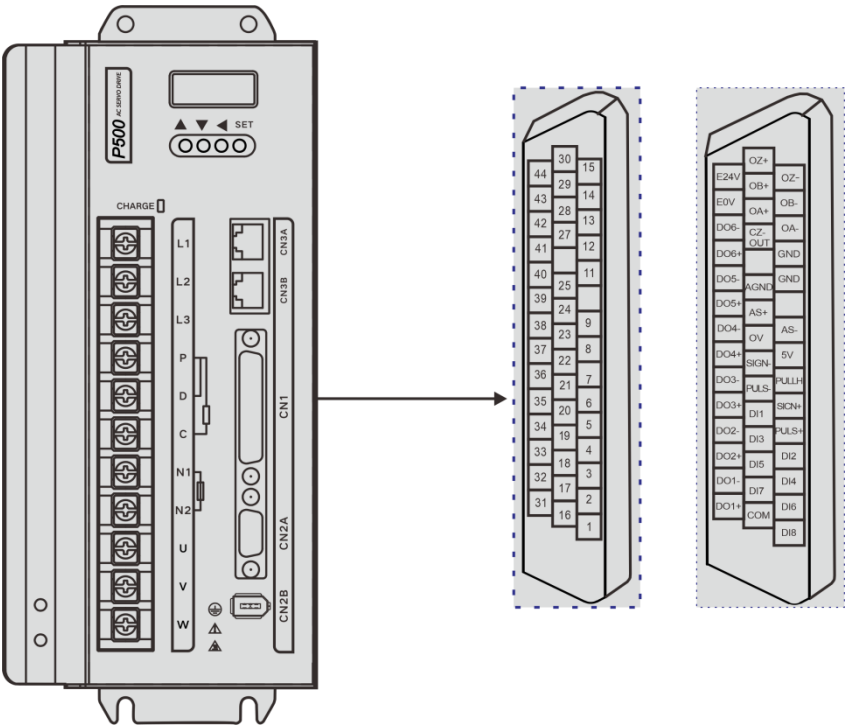
4.4 CN1 Control Signal Terminal

4.4.1 CN1 Terminal Introduction

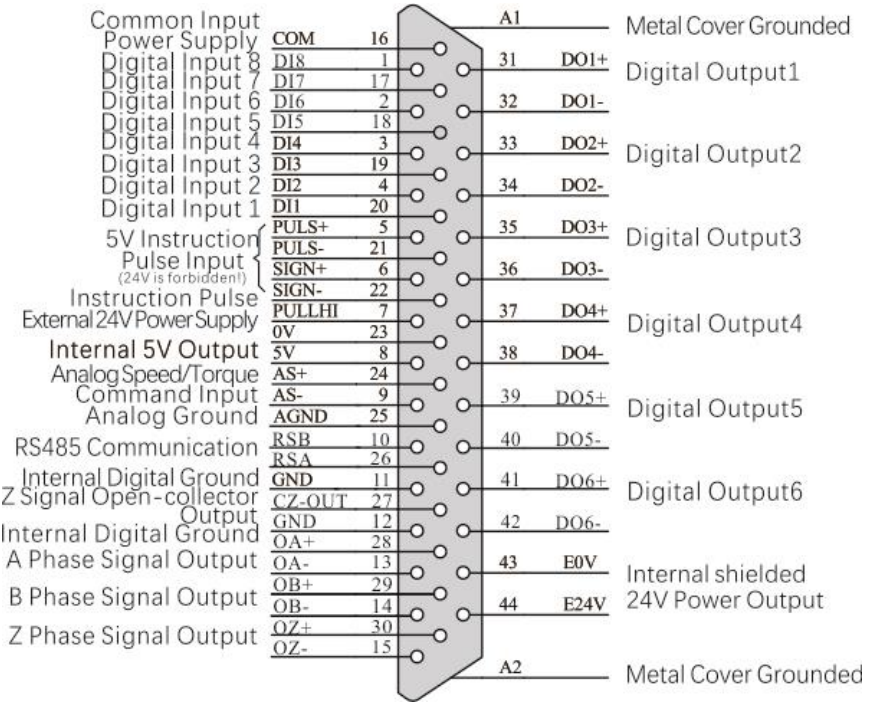
The CN1 connector DB44 plug provides the signals interfaced with the host-controller. The signal includes:

- 8 programmable input terminals
- 6 programmable output terminals
- Analog command inputs
- Pulse command inputs

4.4.2 CN1 terminal pin distribution



Pic 4.4 CN1 Terminal Pin Distribution



Pic 4.5 CN1 Terminal

4.4.3 Position Instruction Input Signal

Signal Name		Pin No.	Function
Position Pulse Instruction	PULS+	5	High speed photo isolation input. Working mode is set by parameter PA14: ● Pulse+direction. ● CCW/CW pulse. ● A、B orthogonal pulse. ● Input of internal position control.
	PULS-	21	
	SIGN+	6	
	SIGN-	22	
	PULLHI	7	External 24V power input interface of the instruction pulse.
	GND	11	Internal digital signal ground.

The output circuit of instruction pulse of the upper device side can be selected from the differential output or collector open circuit output . Its maximum input frequency and minimum pulse width are shown in the following table:

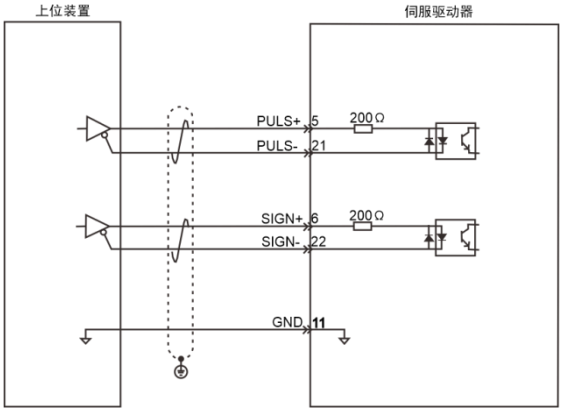
pulse mode	Maximum frequency (pps)	Minimum pulse width(us)
differential output	500k	1
collector open circuit	200k	2.5

◆ If the output pulse width of the upper device is less than the minimum pulse width, it will cause the drive to receive error pulses.

◆ The terminal between PULS+ and PULS-/SIGN+ and SIGN- only support below 5V signal. If over than 5V, it needs to connect external resistances.

Input Circuit Of Pulse Instruction Diagram

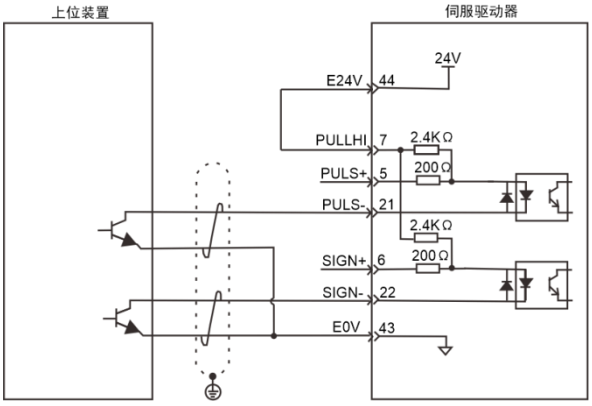
1) When it is differential mode:



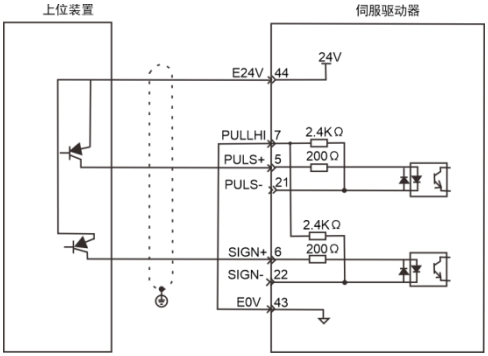
2) When it is collector open mode

A) For internal 24V power sources:

- Common Anode Connection, for example: Mitsubishi PLC.



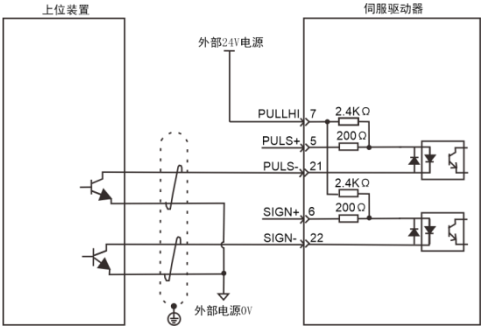
- Common Cathode Connection, for example: Siemens PLC.



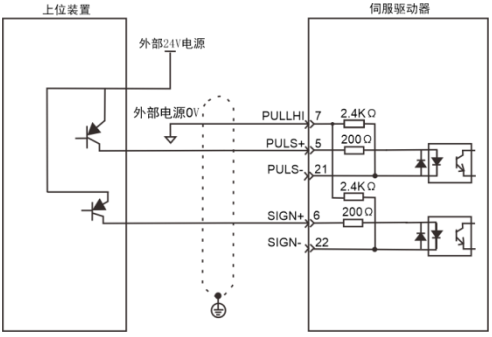
B）For external power supply:

Case 1: To use internal resistance of the drive (recommended).

- Common Anode Connection：

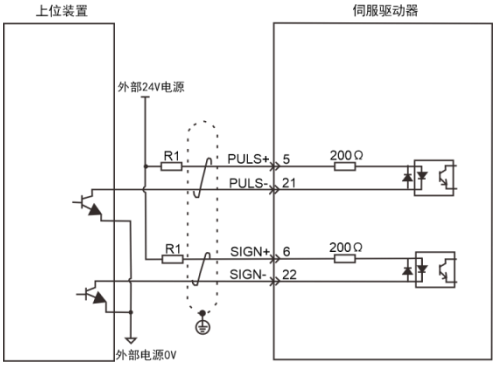


- Common Cathode Connection:



Case 2: To use external resistance of the drive.

- Common Anode Connection：



- Common Cathode Connection:

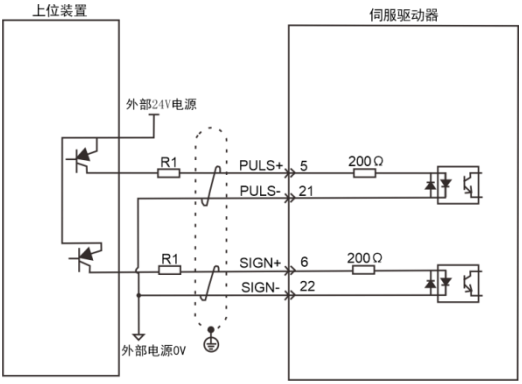


Table 4-1 R1 Recommendation

NOTE

◆ How to calculate the value of resistanceR1：

$$\frac{VCC-1.5}{R1+200} = 10\ mA$$

VCC Voltage	R1	Power
24V	2.0 KΩ	0.5W
12V	1.0KΩ	0.5W

4.4.4 Digital Quantity Input And Output Signal

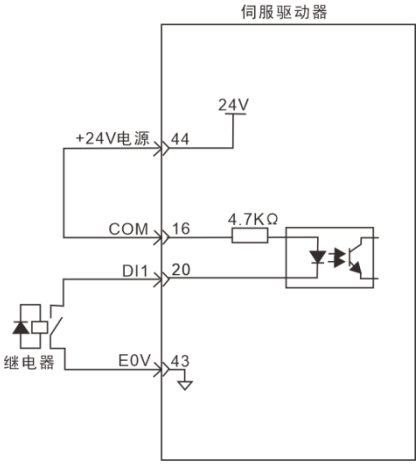
Signal Name		Pin No.	Function	Introduction
Digital Input	DI1	20	servo enable	Optocoupler input and function can be programmable.Defined by parameter P3 group(P3-0~P3-17). Note: COM terminal is a common anode or common cathode interface, and the input level is 12V-24V.
	DI2	4	alarm clearance	
	DI3	19	CW drive inhibition	
	DI4	3	CCW drive inhibition	
	DI5	18	Forward external torque limit	
	DI6	2	Reverse external torque limit	
	DI7	17	Zero-speed clamp	
	DI8	1	Zero instruction	
	COM	16	Common end of digital input signals	
Digital Output	DO1+	31	Servo ready	Photo isolation output.Function can be programmable. Defined by parameter P3 group (P3-20~P3-23).
	DO1-	32		
	DO2+	33	Alarm output	
	DO2-	34		
	DO3+	35	Positioning completion	
	DO3-	36		
	DO4+	37	Magnetic brake	
	DO4-	38		
	DO5+	39	Speed arrival	
	DO5-	40		
	DO6+	41	Torque arrival	
	DO6-	42		
Internal Power Output	0V	23	Internal 0V	Internal 5V power output and the max output current 200mA。
	5V	8	Internal 5V	
Internal Power Output	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	

- **Input Circuit Of Digital Quantity Diagram**

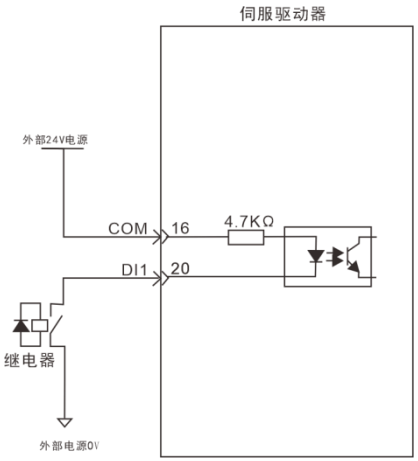
For DI1 as an example(the DI1~DI4 interface circuit is the same)：

1） When the upper device is relay output：

A) For internal 24V power supply:

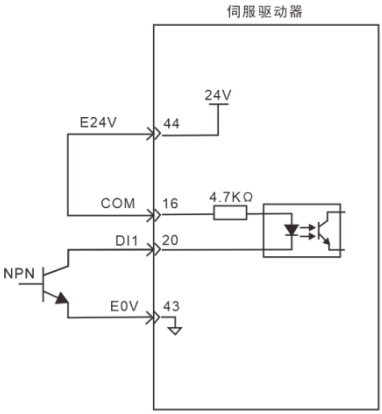


B) For external 24V power supply:

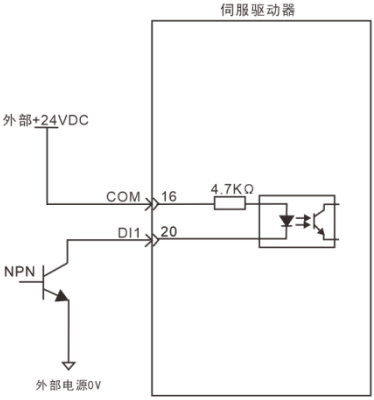


2）When the upper device is collector open output：

A) For internal 24V power supply:



B) For external 24V power supply:

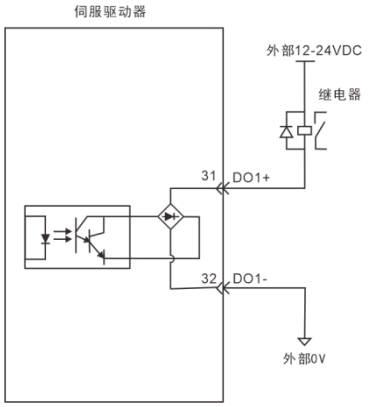


◆ The combination of PNP and NPN input is not supported.

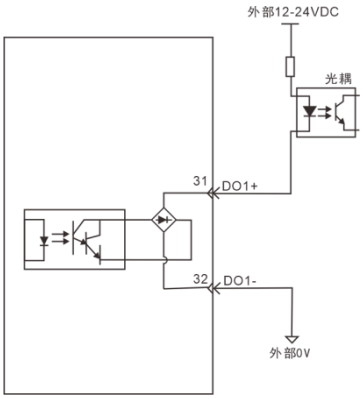
- **Output Circuit Of Digital Quantity Diagram**

For DO1 as an example(the DO1~DO4 interface circuit is the same)：

1) When the upper device is relay input：



2) When the upper device is optocoupler input:



NOTE

- ◆ Be sure to connect a continuation diode when the upper device is a relay, otherwise it may damage DO ports or cause strong signal interference.
- ◆ The maximum allowable voltage and current capacity of the optocoupler output circuit in the servo drive are as follows:
- ■ Voltage：DC30V
- ■ Current：DC50mA

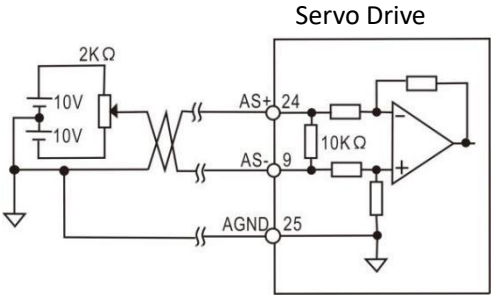
4.4.5 Analog instruction signal

Signal Name		Pin No.	Function
Analog instruction input	AS+、AT+	24	Analog velocity/torque input, range: -10V~+10V.
	AS-、AT-	9	
	AGND	25	

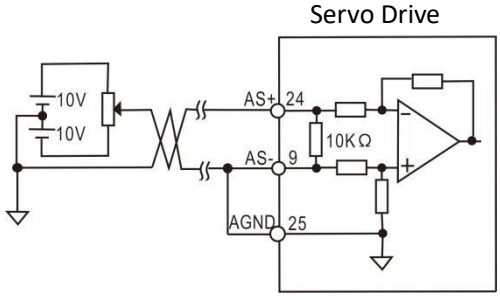
Pulse Instruction Input Interface Diagram

Two input types: differential (recommended) and single-end. Speed and torque share one analog input at range from -10V to +10V with resistance approximately at 10 KΩ. The existence of zero bias in the analog input is normal and can be compensated by parameters.

1） When it is analog differential input:



2）When it is analog single-end input:

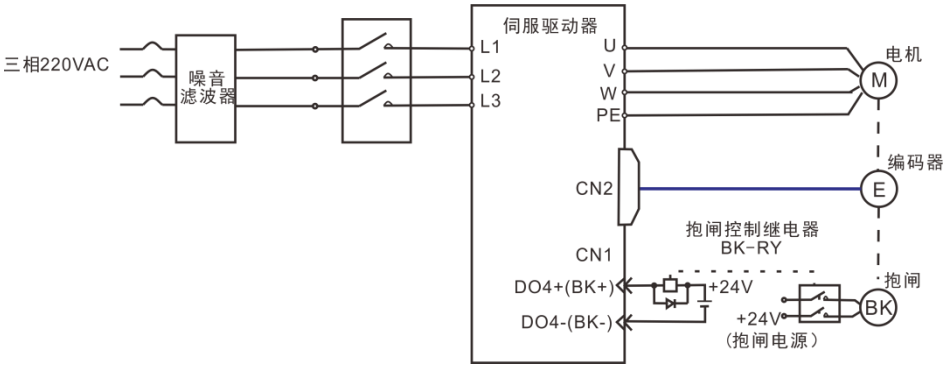


4.4.6 Motor Brake Connection

The brake lock is the mechanism that prevents the servo motor shaft from moving when the servo drive is in non-enabled state, so that the motor keeps the position locked and the moving part of the machinery will not move because of itself or external force.

Brake Signal Circuit Diagram

The brake connection of the input signal without polarity, but it needs users to prepare a 24V power supply. An example of the standard connection between the brake signal BK and the 24V power supply is shown below:



Pic 4.6 Brake Signal Connection

◆ The brake mechanism built into the servo motor is a fixed special mechanism of non-electric action type, which can not be used for braking purposes. Only when the servo motor is kept in a stop state can it work.

◆ The brake coil has no polarity.

◆ After the servo motor stops, the servo signal (Servo On) should be cut off.

◆ When the motor with the built-in brake is running, the brake may make a “click” sound, which has no effect on its function.

When the brake coil is electrified (open state of the brake), flux leakage may occur at the shaft end and other parts. Therefore the nearby devices might be interfered..

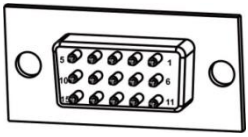
◆ It is forbidden to share the power supply with other electrical appliances, which is to prevent the voltage or current from decreasing resulting to the wrong work due to other electrical appliances.

◆ Above 0.5 mm^2 cable is recommended.

4.5 CN2 Encoder Signal Terminal

4.5.1 CN2A Terminal Introduction

The encoder signal connector CN2 connects with the incremental encoder. A 15 pins plug is used. The pin chart as followings:



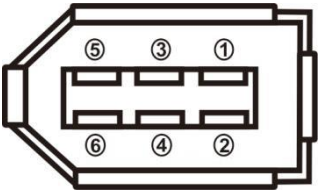
Pic 4.7 CN2A Incremental Encoder Signal Terminal

4.5.2 CN2A Terminal Signal Introduction

Signal Name		Pin No.	Introduction
Encoder Signal Power Supply	5V	5	Use 5V power supply (Provided by servo driver). If the cable is longer than 20m and prevent encoder from voltage dropping down, it is better to use multi wires or thick wires for power line and ground line.
	GND	10	
		15	
Encoder A Phase Input	A+	6	Connect with A phase output of encoder.
	A-	1	
Encoder B Phase Input	B+	7	Connect with B phase output of encoder.
	B-	2	
Encoder Z Phase Input	Z+	8	Connect with Z phase output of encoder.
	Z-	3	
Encoder U Phase Input	U+	9	Connect with U phase output of encoder.
	U-	4	
Encoder V Phase Input	V+	11	Connect with V phase output of encoder.
	V-	12	
Encoder W Phase Input	W+	13	Connect with W phase output of encoder.
	W-	14	
Shielded Ground	Metal Cover		Connect with the shielded layer of the ecoder cable

4.5.3 CN2B Terminal Introduction

The encoder signal connector CN2 connects with the absolute encoder. A 6 pins plug is used. The pin chart as followings:



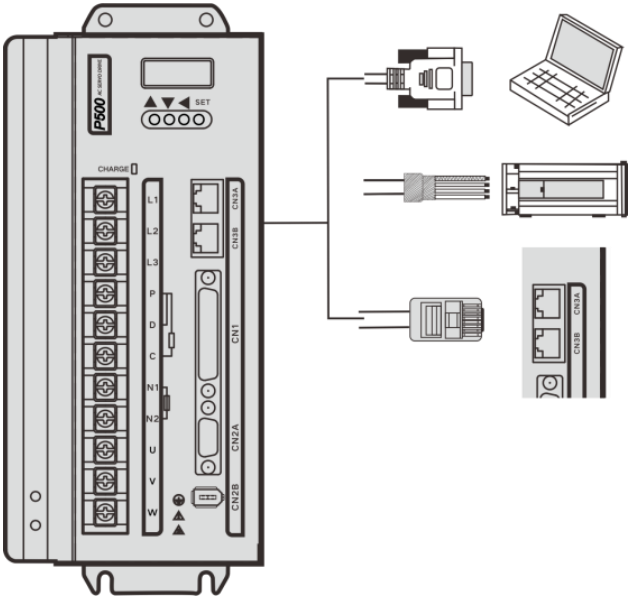
Pic 4.8 CN2B Encoder Signal Terminal

4.5.2 CN2B Terminal Signal Introduction

Signal Name		Pin No.	Function
Encoder Power Supply	5V	5	Use 5V power supply (Provided by servo driver). If the cable is longer than 20m and prevent encoder from voltage dropping down, multi wires or thick wires is recommended for power cable and ground cable.
	0V	6	
Absolute encoder communication positive	SD+	1	Absolute encoder communication positive end
Absolute encoder communication negative	SD-	2	Absolute encoder communication negative end
Null	NC	3	Retain
Null	NC	4	Retain
Shielded layer	Metal cover		Connect to the shielded layer of the encoder cable

4.6 CN3 And CN4 Communication Interface

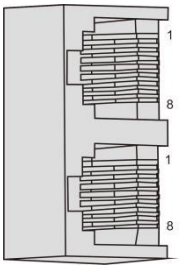
4.6.1 Communication Terminal Wiring Diagram



Pic 4.9 Communication Terminal Wiring

4.6.2 Communication port definition

Through the CN3 and CN4 ports on the drive, the communication can be established between the drive and PC、PLC and other drives. The CN3 and CN4 pins are defined as follows:

Terminal	CN3A	Name	CN3B	Name	Picture
1	CAN H	CAN Bus communication	CAN H	CAN Bus communication	
2	CAN L		CAN L		
3	PGND	CAN ground	PGND	CAN ground	
4	RS485 -	RS485 communication	RS485 -	RS485 communication	
5	RS485+		RS485+		
6	NC	Null	NC	Null	
7	GND	485 ground	GND	485 ground	
8	NC	Null	NC	Null	

◆ It can connect PC or the upper controllers through a special serial port cable, and it is forbidden to plug with electric.

◆ It is recommended to use twisted pair or shielded wire, the length of the wire is less than 2 meters.

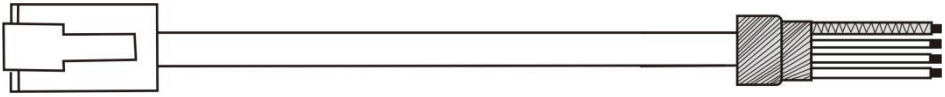
◆ Multi-drives series connected, CN3A connect with last CN3B, and CN3B connect with next CN3A.

◆ When using RS485 bus communication and RS485 ground signal of the upper controller is connected to the earth (PE), please connect PE terminal of the upper controller with the drive terminal properly. In this case, it is forbidden to connect RS485 ground signal of the upper controller with the drive RS485 ground signal (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:



A **B**

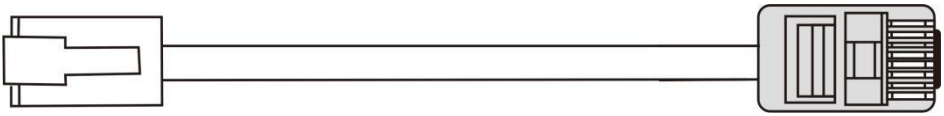
Pic 4.10 The Communication Cable Of Servo Drive With PLC

Table 4-2 Connection Between Servo Drive And PLC Communication Cable

Drive RJ45(A end)		PLC （B end）	
Signal Name	Pin No.	Signal Name	Pin No.
RS485+	5	RS485+	5
RS485-	4	RS485-	4
GND	7	GND	7
PE （shielded layer）	Cover	PE （shielded layer）	Cover

2. RS485 Communication Parallel Connection Of Multi Drives

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



A B

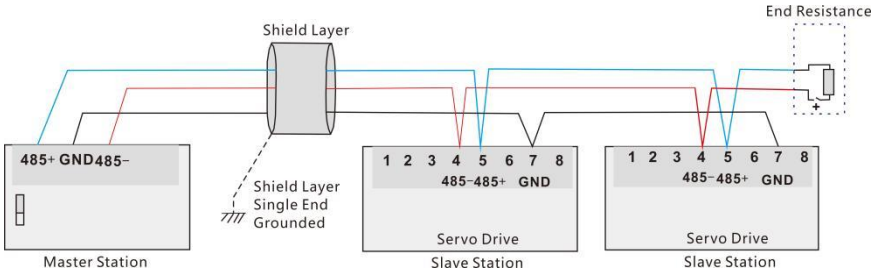
Pic 4.11 Parallel Cable Diagram Of Multi Drives

Table 4-3 Connection Between Multi Drives

Drive RJ45(A end)		PLC（B end）	
Signal Name	Pin No.	Signal Name	Pin No.
RS485+	5	RS485+	5
RS485-	4	RS485-	4
GND	7	GND	7
PE（shielded layer）	Cover	PE（shielded layer）	Cover

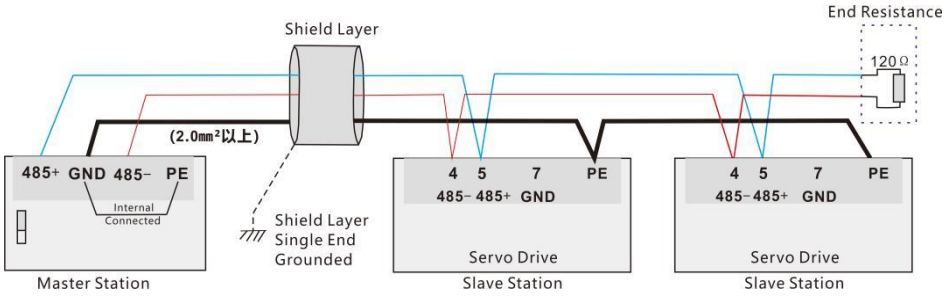
3. RS485 Communication Grounding Precaution

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:



Pic 4.12 RS485 Communication Diagram

As shown in the picture below, when using RS485 communications, the ground signal of the upper device is connected with the earth:



NOTE

- PLC is built in RS485 communication terminal resistor.
- It is suggested that the shield layer should be ground at one end.
- Never connect the GND terminal of the upper device with the servo drive E0V terminal, otherwise the machine will be damaged.

4.7 Anti-jamming Countermeasures of Power Wiring

To suppress interference, please take the following measures:

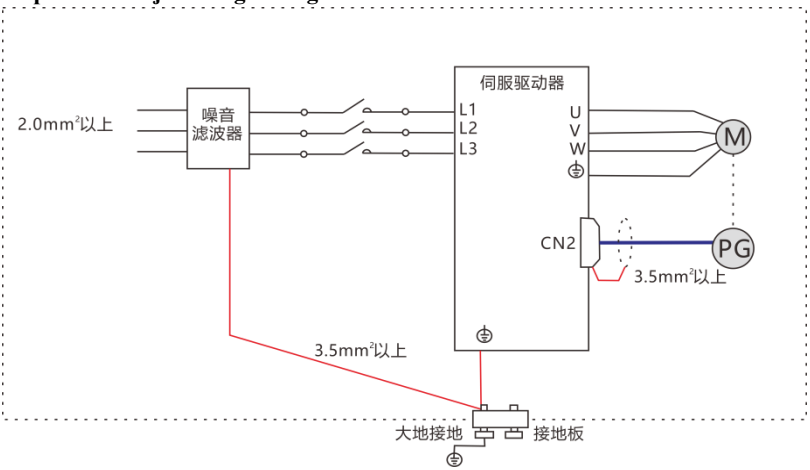
- Instruction input cable length should be less than 3 meters,and encoder cable should be less than 20 meters.
- Recommend grounding cable over 2.0 mm²
- Please install a noise filter on the input side of the power cable to prevent radio frequency interference.
- To avoid electromagnetic interfering, the following methods can be used:

1) Install the upper device and a noise filter near the servo drive.
2) Install a surge suppressors on coils of relays, solenoids, electromagnetic contacts.
3) Separate high and low voltage cables away minimum at 30 cm.
4) Do not share a power supply with welding devices, discharge processing devices, etc.

When there is a high frequency generator nearby, please install a noise filter on the input side of the power cable.

4.7.1 Wiring Examples Of Anti-Jamming And Ground Handling

1. Examples of anti-jamming wiring



Pic

4.13 A Example Of Anti-Jamming Wiring

NOTE

◆ The outer box connection wire used for grounding should be thicker than 3.5mm² as far as possible, and braid copper wire is recommended.

◆ When using the noise filter, please follow the precautions described in "How to Use the Noise Filter" below.

2. Ground handling

To avoid electromagnetic interference problems, please ground as below.

1) Grounding of servo motor housing

Please connect the grounding terminal of the servo motor with the grounding terminal PE of the servo driver and ground the PE terminal reliably to reduce the potential electromagnetic interference problem.

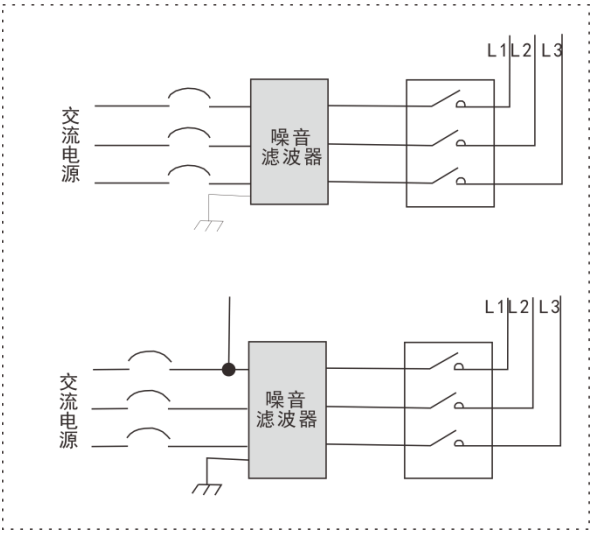
2) Encoder Cable Shield Grounding

Please ground both ends of shield layer of motor encoder cable.

4.7.2 How To Use A Noise Filter

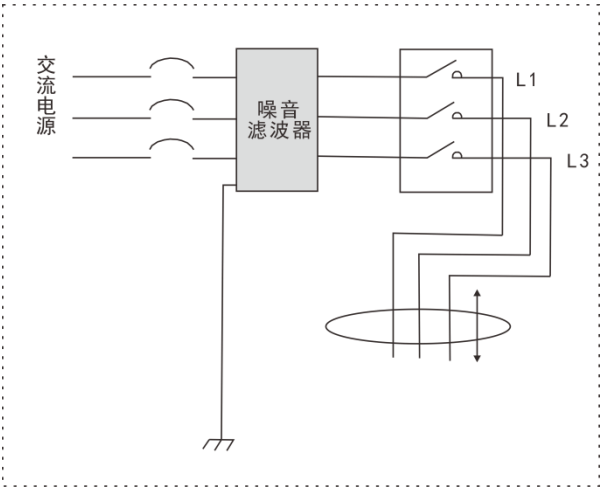
In order to prevent the interference of the power cable and weaken the influence of the servo driver on other sensitive devices, please select a corresponding noise filter at the input end of power supply according to the input current. Meanwhile, please install the noise filter at the power cable of peripheral device if needed. Please observe the following precautions when installing and wiring the noise filter so as not to weaken the actual use effect of the filter.

- Please separate the input and output cables of the noise filter, and do not put both into the same pipe or tie them together.



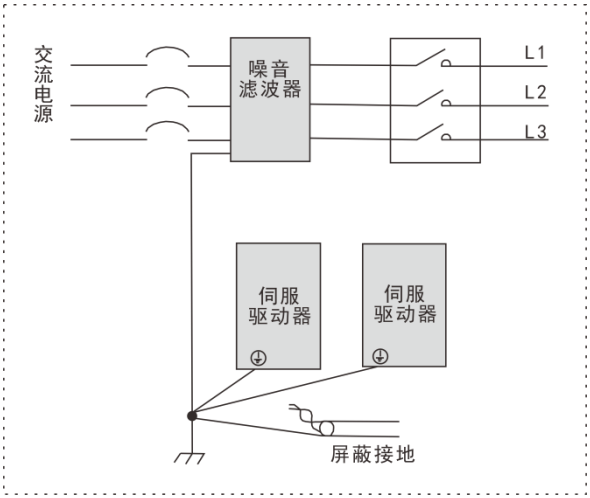
Pic 4.14 Example Diagram Of Noise Filter Input And Output Cables

- The ground wire of the noise filter is separated from its output power cord.



Pic 4.15 Diagram Of Separating Cables Between Ground And Output Line Of Noise Filter

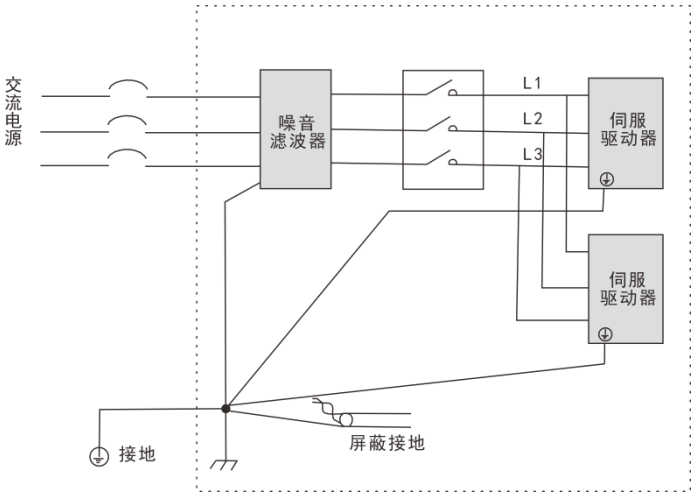
- Noise filters need to use a thick cable as short as possible to ground separately, and do not share a ground wire with other grounding equipment.



Pic 4.16 Single Point Grounding Diagram

- The ground handling of a noise filter installed in the control cabinet.

when the noise filter and servo driver are installed in the same control cabinet, it is recommended that the filter and servo driver are fixed on the same metal plate. To ensure the contact part is conductive and lapped well, and the metal plate is grounded.



Pic 4.17 Ground Connection Handling Of Noise Filter

Chapter 5 Running Mode And Controlling Wiring

According to the command mode and operation characteristics of a servo drive, it can be divided into three operation modes: position control operation mode, speed control operation mode and torque control operation mode.

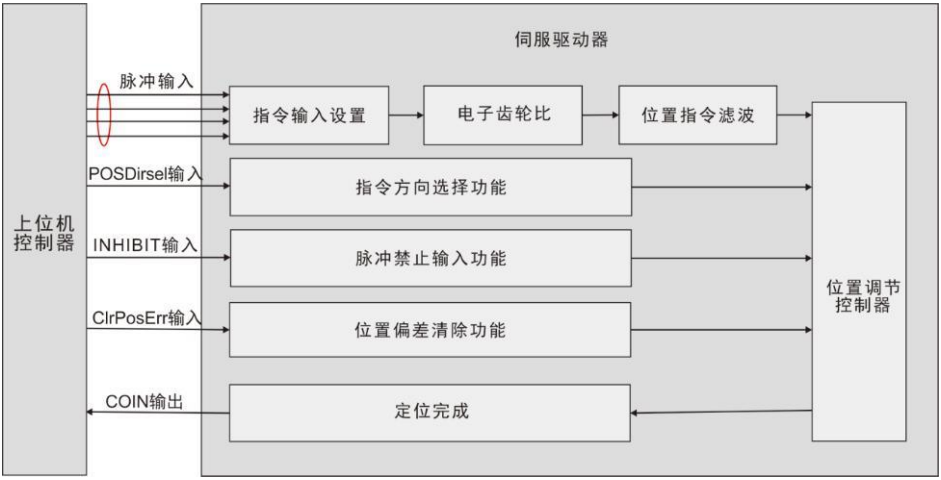
- The position control mode usually determines the displacement of the movement by the number of pulses, and the pulse frequency of the external input determines rotation speed. Because the position mode can strictly control the position and speed, it is generally used in the positioning device. It is the most popular control mode and mainly used in robot, table placement machine, carving and milling, CNC machines and so on.

- The speed control mode controls rotation speed through the given analog quantity, the given digital quantity and the given communication speed. It is mainly used in the constant-speed applications. For example, the upper computer adopts position control mode and the servo drive adopts speed control mode in application of carving and milling machines.

- The torque control mode controls torque through the given analog quantity, the given digital quantity and the given communication speed. It is mainly used in winding and unwinding devices which have strict requirements on the force of material, such as winding device or drawing fiber equipment and other tension control applications. The setting of torque should be changed at any time according to the radius of winding to ensure that the force of material will not change with the change of winding radius.

5.1 Position Control Mode

5.1.1 Position Mode Introduction



Pic 5.1 Position Mode Diagram

The main steps for position mode are as follows:

1) Correctly connect the main circuit and the power supply , as well as the motor power cable and encoder cable. After powering on, the drive panel displays ""r O" ,which means that the drive power supply and encoder wiring are correct.

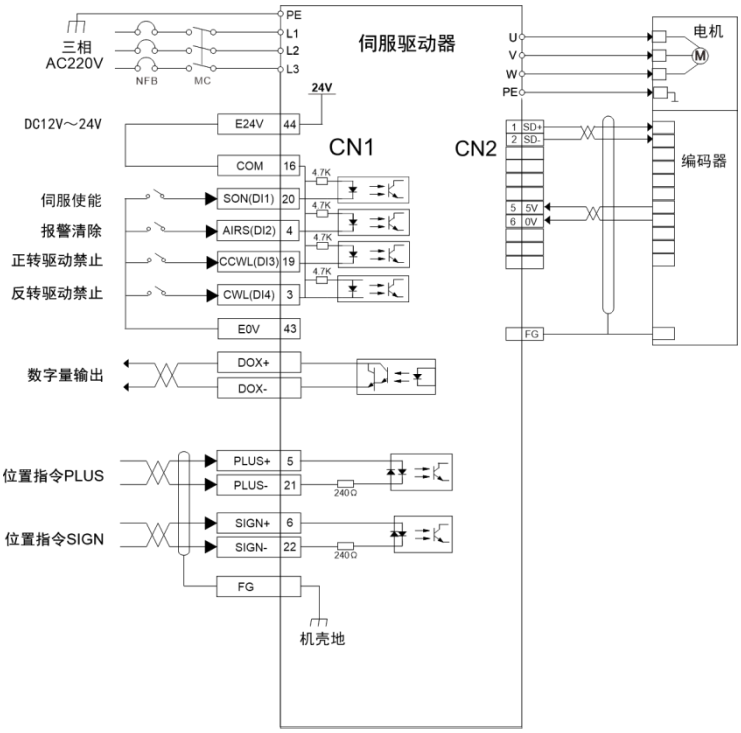
2) Pressing the keys for servo JOG trial operation to confirm whether the motor can run normally.

3) To connect the pulse direction input and pulse instruction input of the CN1 terminal as well as the required DI/DO signals, such as servo enable, alarm clearance, location completion signal, etc based on the figure 5.2 as a reference.

4) Then to make some setting operations. DI/DO can be set according to actual situation.

5) For servo enable, the servo motor rotation is controlled by the position instruction from the upper computer. Firstly make the motor rotate at low speed, and confirm whether the rotation direction and electronic gear ratio are normal, then make the gain adjustment.

5.1.2 Position Mode Wiring



Pic 5.2 Position Mode Wiring

◆ The voltage of the internal 24V power supply ranges 20V~28V, and maximum operating current 100mA. If use a external 24V power supply, please connect the external 24V+ to pin16(COM) and the external 0V to pin43(E0V).

◆ A power supply for DO output should be prepared by customers. The power ranges 5V~24V. The maximum allowable voltage is DC30V and current is 50mA.

5.1.3 Parameter Settings In Position Mode

- **Gain And Smooth Filter**

Parameter	Introduction	Range	Default Value
PA4	Control mode	0	0
PA9	Position Proportional Gain	1-1000	80
PA19	Position Command Smooth Filter	0-1000×0.1ms	100
PA100	Command Filter Selection	0-1	0

- **Digital Input**

Parameter	Introduction	Range	Default Value
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	2nd numerator of electronic gear for position pulse	1-32767	0
PA78	3rd numerator of electronic gear for position pulse	1-32767	0
PA79	4th 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

- **Digital Output(DO)**

Parameter	Introduction	Range	Default Value
PA16	Range of positioning completion	0-3000pulses	130
PA17	Position deviation limit	0-30000×100pulses	6000
PA18	Position deviation error	0-1	0
PA83	CWL,CCWL prohibited mode	0-1	0
PA84	Hysteresis for position completion	0-32767	65
PA85	Range for approach positioning	0-32767	6500
PA86	Hysteresis for approach positioning	0-32767	650

- **Input And Output Terminals**

Parameter	Introduction	Range	Default Value
PA55	Effective level control word for input terminals	0000-1111	0000
PA57	Effective level control word for output	0000-1111	0000
PA58	Time constant of removing jitter for IO input terminal	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	Force digital input valid1	00000000-11111111	00000000
P3-16	Force digital input valid2	00000000-11111111	00000000
P3-17	Force digital input valid3	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 DO1 function	0-99	8

- **Position Command Introduction Of Internal Position Pr Mode**

Pr position command source creates position command. Register takes the 8 groups of parameters （P4-2，P4-3)-(P4-23，P4-24). And then can choose one of 8 groups to be position command to match with 1/O(CN1、POS0-POS2 and CTRG). As below table shows:

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

The state of POS0-2:

0: contact break (open)

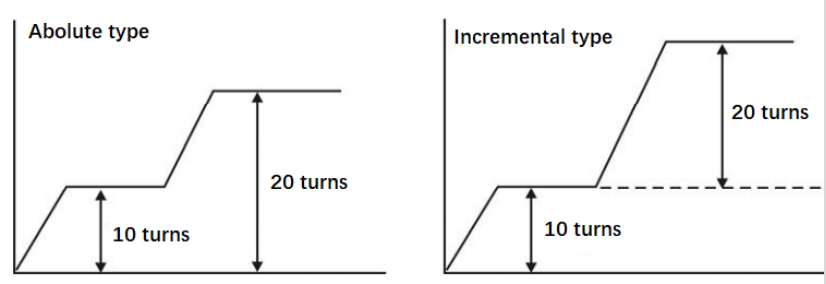
1: contact close

CTRG↑: the moment from open (0) to close (1)

Max: the command pulses of the motor in one revolution

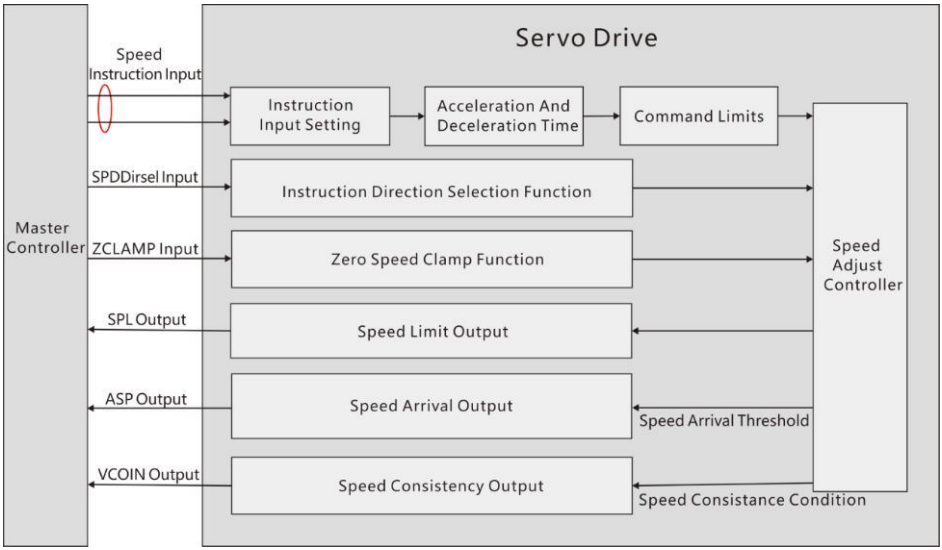
Absolute position register is broadly applied. User can easily complete periodicity actions by the above table. For example, the position command P1=10 revolution, P2=20 revolution. P1 should be followed by P2.

Differences between P1 and P2 as below:



5.2 Speed Control Mode

5.2.1 Introduction



Pic 5.3 Speed Control Mode

The main steps to use the speed control mode are as follows:

1) correctly connect the servo main circuit and the power supply of the controller, as well as the motor cable and encoder cable. The servo panel displays"r 0" after powering on which means that the servo power supply and encoder connection are correct.

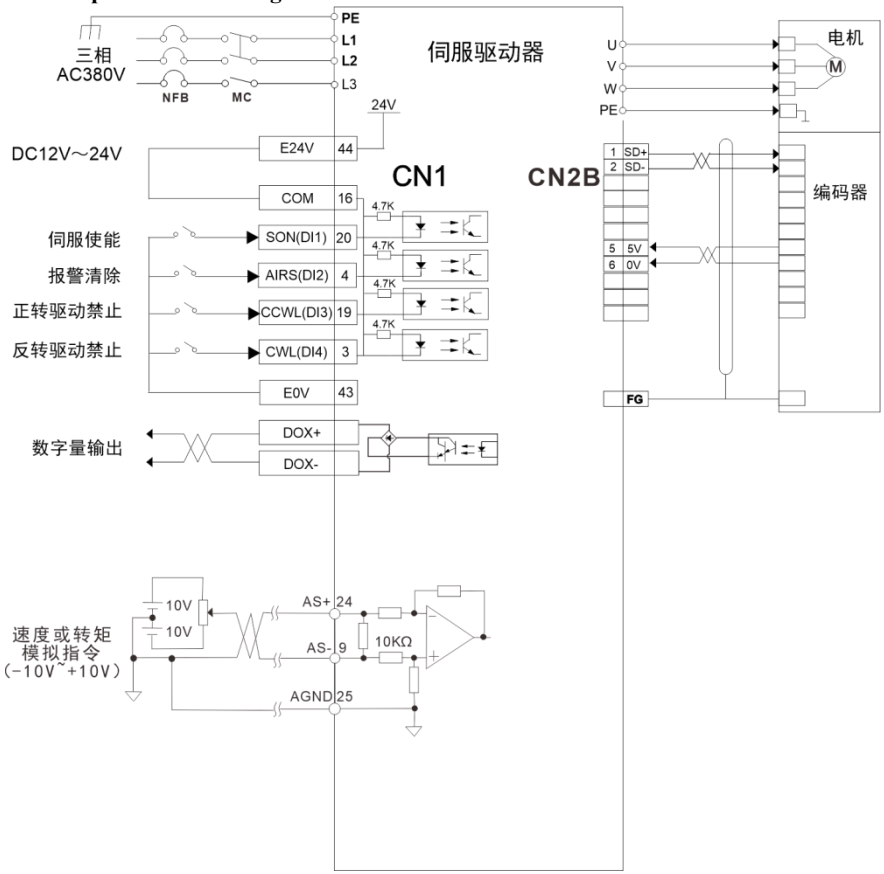
2)Operate the servo JOG trial running mode through the panel keys to confirm whether the motor can run normally.

3) To connect the required DI/DO signals in CN1 terminal, such as servo enable, alarm clearance, positioning completion signal, etc referring figure 5.4.

4) To operate speed mode related setting. DI/DO are used to set according to your application.

5) To make the servo enabled and the servo motor rotation is controlled by the position instruction issued by the upper computer. First make the motor rotate at low speed, and confirm whether the rotation direction and electronic gear ratio are normal, then make the gain adjustment.

5.2.2 Speed Mode Wiring



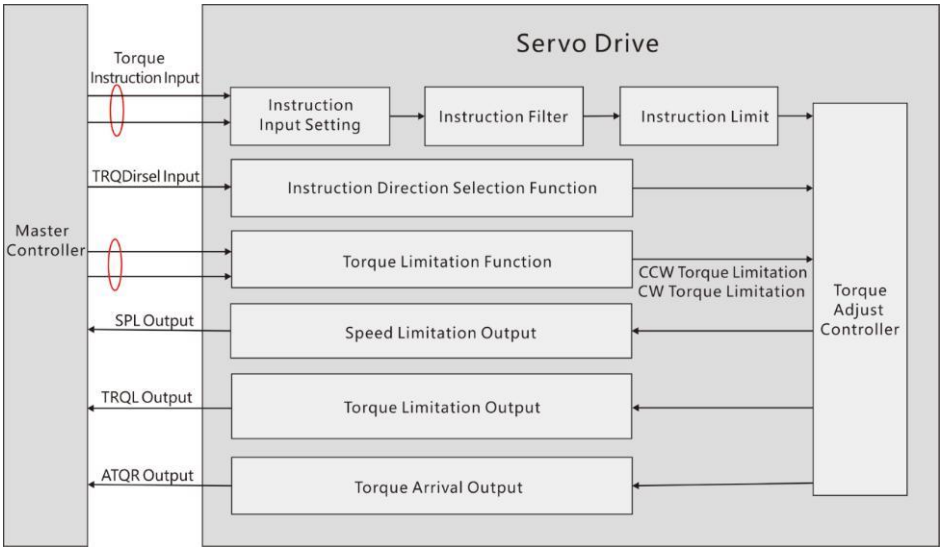
Pic5.4 Speed Mode Wiring

5.2.3 Parameter Settings In Speed Mode

Parameter	Introduction	Range	Default Value
PA4	Control Mode	1	0
PA5	Speed Proportional Gain	5-2000Hz	150
PA6	Speed Integral Constant	1-1000ms	75
PA22	Internal And External Speed Instruction 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 Speed4	-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	Gain Of Analog Speed Command	10-3000r/min/v	300
PA44	Direction Of Analog Speed Command	0-1	0
PA45	Zero Offset Compensation Of Analog Speed Command	-5000-5000	0
PA46	Filter Of Analog Speed Command	1-300Hz	300
PA75	Zero-speed Detection Point	0-1000r/min	10
PA76	The Setting Value For Speed Consistent	0-1000r/min	10
PA87	Hysteresis Of Arrival Speed	0-5000r/min	30
PA88	Polarity Of Arrival Speed	0-1	0
PA92	Hysteresis For Zero Speed Detection	0-1000r/min	5

5.3 Torque Control Mode

5.3.1 Introduction



Pic 5.5 Torque Control Mode

The main steps to use the speed control mode are as follows:

1) Correctly connect the servo main circuit and the power supply of the controller, as well as the motor cable and encoder cable. The servo panel displays"r 0" after powering on which means that the servo power supply and encoder connection are correct.

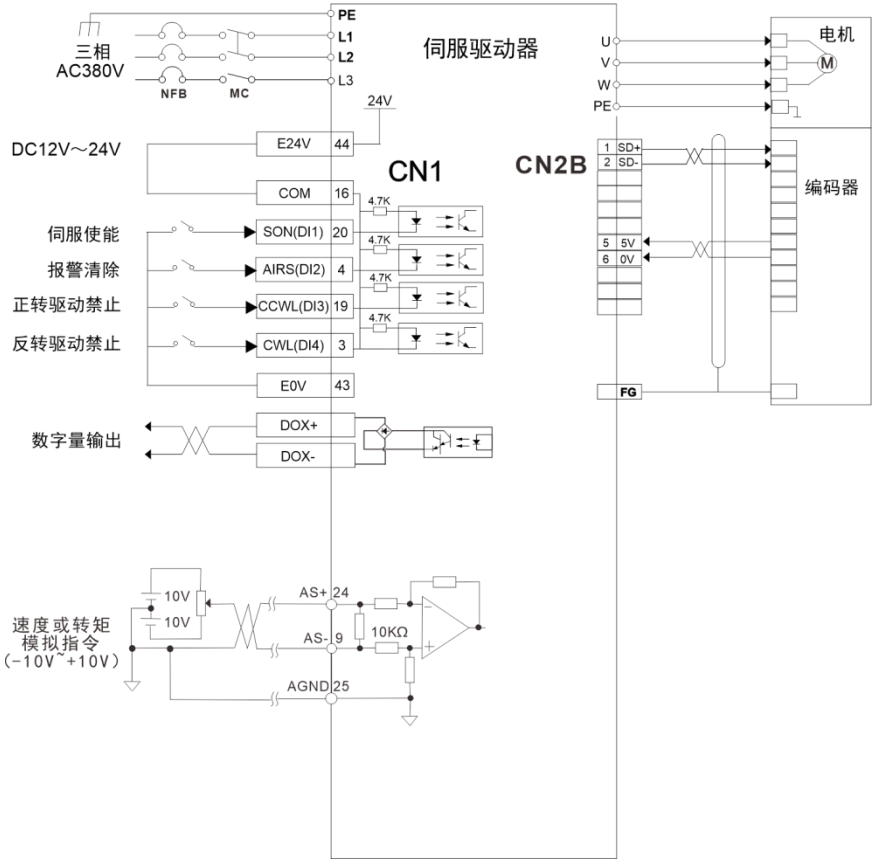
2) Operate the servo JOG trial running mode through the panel keys to confirm whether the motor can run normally.

3) To connect the required DI/DO signals in CN1 terminal, such as servo enable, alarm clearance, positioning completion signal, etc referring figure 5.6.

4) To operate torque mode related setting. DI/DO are used to set according to your application.

5) To make the servo enabled and the servo motor rotation is controlled by the position instruction issued by the upper computer. First make the motor rotate at low speed, and confirm whether the rotation direction and electronic gear ratio are normal, then make the gain adjustment.

5.3.2 Torque Mode Wiring



Pic5.6 Torque Mode Wiring

5.3.3 Parameter Settings In Torque Mode

Parameter	Introduction	Range	Default Value
PA4	Control mode	2	0
PA29	Gain of analog torque command	Set by yourself	30
PA32	Selection for internal and external torque command	0-2	0
PA33	Direction of analog torque command	0	0
PA39	Zero offset compensation of analog torque command	0	0
PA50	Speed limit in torque control mode	Set by yourself	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	Inhibition method	0-1	0
PA89	Arrival torque	-300%-300%	100
PA90	Hysteresis of arrival torque	0%-300%	5
PA91	Polarity of arrival torque	0-1	0

5.4 Origin Regression Function And Relevant Parameters Introduction

5.4.1 Relevant Parameter Settings

Parameter	Introduction	Value	Default Value
P4-32	Origin detector type or search direction setting	0-5	0
P4-33	Set the model of short distance movement to the origin	0-2	0
P4-34	Origin trigger start mode	0-2	0
P4-35	Origin stop mode setting	0-1	0
P4-36	The first stage of high speed origin regression speed setting	1-2000 r/min	1000
P4-37	The second stage of low speed origin regression speed setting	1-500 r/min	50
P4-38	Cycles of origin regression offset	+/-30000	0
P4-39	Pulses of origin regression offset	+/-max cnt	0

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

A. Origin trigger start mode(P4-34)

The origin trigger start mode is divide into two kinds of origin regression function. One is automatic performing and another is contacting trigger. Details as below:

P4-34=0: close origin regression function. When set P4-34=0, the origin regression function can not work not matter what its setting value is.

P4-34=1: when the power is on, it will execute origin regression automatically. The function is available one when the power supply and servo on,which means it is unnecessary to repeat the operation when the servo works. It can save one input contact used to perform the origin regression.

P4-34=2: It triggers origin regression function through the input contact SHOM.

One of registers which are input pin function planning register must be set to SHOM trigger input function. The SHOM contact can be triggered at any time during the servo working and the function of origin regression can be performed.

B. Origin trigger start mode(P4-32)

The origin detector can use either the left limit switch or the right limit switch as the reference point for the origin. Or it can use extra detectors such as near type or light-gate type switch) as the reference. The Z pulse can be also set as a reference point when the servo motor moves in only one revolution.

P4-32=0: CW direction finds the origin and use CCWL limit as a rough reference point. When completing origin positioning, CCWL is limit input function. The subsequent triggers will occur limit warning. When using limit input point as a rough reference point, recommended to set Z pulse(P4-33) as the precise mechanical origin.

P4-32=1: CCW direction finds the origin point and use CWL limit as a rough reference point. CWL is limit input function.The subsequent triggers will occur limit warning. When using limit input point as a rough reference point, recommended to set Z pulse(P4-33) as the precise mechanical origin.

P4-32=2: CW direction finds the origin point and use ORGP(external detector input point) as the origin point reference. Then Z pulse of return search(P4-33=0) or do not return search(P4-33=1) can be set as the precise mechanical origin point. If do not use Z pulse as the mechanical origin point, the positive edge of ORGP can be also set as the mechanical origin point(P4-33=2).

P4-32=3: CCW direction finds the origin point and use ORGP(external detector input point) as the origin point reference. Then Z pulse of return search(P4-33=0) or do not return search(P4-

33=1) can be set as the precise mechanical origin point. If do not use Z pulse as the mechanical origin point, the positive edge of ORGP can be also set as the mechanical origin point(P4-33=2).

P4-32=4: CW direction finds Z pulse origin point directly. This function is usually used for servo motor motion control in only one rotation range and now any detector switches are unnecessary connected.

P4-32=5: CCW direction finds Z pulse origin point directly. This function is usually used for servo motor motion control in only one rotation range and now any detector switches are unnecessary connected.

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

P4-33=0: after the origin point has been found, the servo motor returns at the second stage of speed to search the nearest Z pulse as the mechanical origin point.

P4-33=1: after the origin point has been found, the servo motor changes to the second stage of speed to keep searching the nearest Z pulse as the mechanical origin.

P4-33=2: the rising edge of ORGP which was found is set as the mechanical origin point and stops according to deceleration, which is applied to P4-32=2 or 3. Or when found Z pulse, it stops according to deceleration, which is applied to P4-32=4 or 5. And the value of P4-32 for detecting origin detection is only applicable to 2 or 3. Under Z pulse origin point detecting, P4-32 is only applicable to 4 or Z pulse.

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

P4-35=0: after the origin detection has been completed, the motor slows down and is pulled back to the origin point. The motor slows down and stops when it gets the signal of origin detection at the second stage of speed.Then it moves back to the mechanical original position.

P4-35=1: after the origin detection has been completed, the motor decelerates and stops in the forward direction. The motor slows down and stops when it get the signal of origin detection at the second stage of speed. Then position overrun is no longer modified and the mechanical original position would not change even there are different position overruns.

5.5 Pre-operational Inspection

Please first detach the load connected to the servo motor, the coupling connected to the servo motor shaft and its associated accessories. Ensure that the servo motor can work normally without load, and then connect the load to avoid unnecessary dangers.

- Check and ensure before running:

1) There is no obvious damage to the appearance of the servo drive.

2) Wiring terminals are insulated.

3) There are no conductive objects, such as screws or metal plates, combustible objects inside the drive, and no conductive objects at the connection port.

4) Do not place the servo drive or a external brake resistor on combustibles.

5) Please wire correctly.

- Driver power supply, auxiliary power supply, grounding end and other wiring should be wired correctly. Each control signal cable connection should be correct. Each limit switch, protection signal have been correctly connected.

1) Enabled switch in OFF state.

2) Cut off power supply circuit and stop alarm circuit to maintain access ope.

3) Servo driver applied voltage reference should be correct.

- Power the servo drive when the controller does not send a running command signal. Check and guarantee:

1) The servo motor can turn normally without vibration or operating sound phenomenon.

2) All parameters are set correctly, according to different mechanical characteristics and please do not over-set extreme parameters.

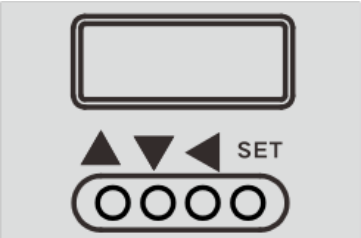
3) Bus voltage indicator lamp and digital tube display are normal.

Chapter 6 Operation And Display

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.From the main menu level.



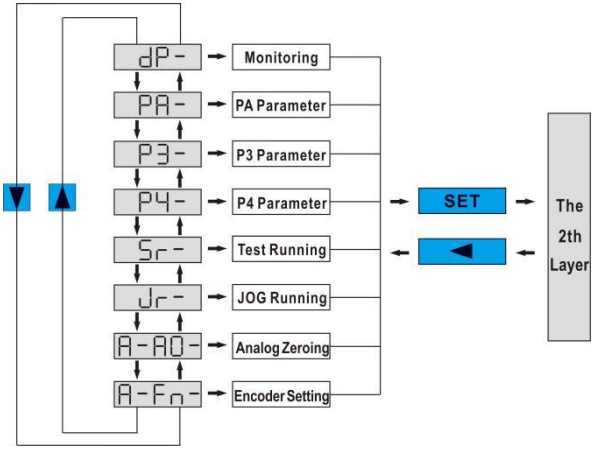
Pic 6.1 Drive Panel Display

6.1.2 Front Keys Introduction

Key	Name	Function
▲	Increasing	Increase sequence number or value;Press down and hold to repeat increasing.
▼	Reducing	Decrease sequence number or value;Press down and hold to repeat decreasing.
◄	Exit	Menu exit; Cancel the operation
SET	Confirm	Menu entered; Confirm the operation

6.2 Main Menu

The first layer is the main menu and has 8 operating modes in total. Press ▲or ▼button to change the operation mode. Then press SET button to enter into the second layer and executes a concrete operation. Press ◄ button returns to the main menu from the second layer.



Pic6.2 Main Menu

6.3 Parameter Setting Process

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

Select parameter setting "P-" from the main menu and press SET to enter the parameter setting mode. First, use ▲,▼ key to select the parameter segment. After selecting it, press the SET key to enter the parameter number selection of the segment. Secondly, use ▲, ▼key to select the parameter number, after selecting, press the SET key to display the parameter value.

Use ▲, ▼ keys to modify parameter values. Press ▲ or ▼, the parameter increases or decreases by 1, press and hold ▲or▼,and the parameter can be continuously increased or decreased. When the parameter value is modified, press the SET key, and the decimal point of the rightmost LED digital tube will light up and blink twice, that is, the modification is complete, and the modified value will be immediately reflected in the control (some parameters need to be saved and re-powered to work).

6.4 Status Monitoring

The first layer is used to select the mode of operation and has 8 operating modes in total. Press ▲or ▼button to change the operation mode. Then press SET button to enter into the second layer of the selected way. Press ◄ button returns to the first layer from the second layer.

In the first layer,select “DP--” and press SET button to enter into monitoring mode. There are 23 displays in total. Users select the desired display mode with ▲or ▼key, and then press SET button to enter into the specific states.

Status	Operation	Example	Definition
P-SPd		r 1000	Motor speed:1000r / min
P-PoS		04580	The current position:124580
P-PoS.		P. 12	
P-CPo		C4581	Position command:124581
P-CPo.		C. 12	
P-EPo		E 4	Position deviation:4 pulses
P-EPo.		E. 0	
P-trq		t 0.70	Motor torque 70%
P- I		I 2.3	Motor current 2.3A
P-Cnt	SET	Cnt 0	Control mode 0：position control
P- CS		r. 500	In speed mode,analog input speed: 500 r/min
P- Ct		t 0.50	In torque mode,analog input torque:50%
P-APo		A3265	Absolute rotor position:3265
P-APo.		A. 0	
P- In		n	Input terminal
P-oUt		oUt1111	Output terminal
P- Cod		Coulm	Encoder signal
P-UdC		UC336	Line voltage:336V

Status	Operation	Example	Definition
P-Err		Err 4	Alarm No. 4
P- rL			Relay open
		rL.-oF	Relay off
		rL-Er	Relay alarming
P- rn		rn - on	Main circuit working normally
		rn.-oF	Main circuit Uncharged
		rn-CH	Main circuit not enabled
		rn-Er	Main circuit alarming
P- US		U-on	Line voltage normally
		U-.LoU	Line voltage too low
		U-Err	Line voltage alarming
P- AS		43210	Absolute motor position876543210
P- AS.		A.8765	

6.5 Analog Quantity Zeroing Adjustment

Using this function,the servo drive can check analog zero offset automatically and write the offset value into parameter PA39 or PA45. The operation has saved offset parameter to EEPROM, so it is unnecessary to write parameters again.

Firstly choose analog zero adjustment mode“A-A0” and press SET key to enter into. Select speed analog zeroing“A-SPd” or torque analog zeroing “A-Trq” and then keep pressing SET key for more than 3s. When it displays “donE”, the activation is completed. Press the ◄button again to return to the menu selection state.

6.6 Encoder Selection

Select "F-res" to reset the encoder and make the encoder multi-circle information zeroing. By setting P3-36 parameter , the single-circle information can be cleared to achieve the purpose of setting the original point. Select" F-clr" to clear the encoder NO. 53 alarm caused by battery power down. After long press the SET key for more than 3s seconds and show "donE", the operation is activate. After that, press the ◄ key to return to the upper menu.

6.7 How To Reset Default Parameters

To recover default parameters when:

- The parameters are scrambled and the system can not work properly.

The steps to recover default parameters as follow:

1. Please connect the motor with the driver and power on. The driver will automatically read the motor parameters and match the motor model.
2. Set password (PA0) to 385.
3. Do the followings:

All parameters are restored to their default values. The modified parameters are also restored to their factory default values.Press the ◄ key to return to the main menu and to select "PA-"with ▲ or ▼ key. Press the **SET** key to enter into the second layer and press the ▲ or ▼ key to make PA=0.Then press the **SET** key to enter into the third layer and set PA0 =385, pressing the **SET** key to save it. Next, press the ◄ key to return to the "PA-" and set the PA1=DEF-. Long press the **SET** key for 5 seconds and after the LED indicator lights flicker several times, the operation is completed Finally, it will work after power on.

Chapter 7 Parameters

7.1 PA Group

No.	Name	Function	Rang	Default Value
0	Password	1. User code:315. 2. Motor model code:385.	0-9999	315
1	Motor selection	The parameter is read-only and can not be modified. The driver automatically identifies the motor model.	80-130	Table 7-1
2	Software version	The software version can be read but can't be modified.		

Table7-1

Drive	ISD500H	
P	80-04025	130-15015
	90-04025	130-15025
	100-03230	150-15020
	100-06430	150-15025
	110-04020	150-18020
	110-04030	150-23020
	110-05030	150-27015
	110-06020	150-27020
	110-06030	150-27025
	130-04025	180-17215
	130-05025	180-19015
	130-06025	180-21520
	130-07725	180-27010
	130-10010	180-27015
	130-10015	180-35010
	130-10020	180-35015
	130-10025	180-48015

No.	Name	Function	Rang	Default Value
3	Initial display status	0:Display motor speed. 1:Display the current position is 5-bit low. 2:Display the current position is 5-bit high. 3:Display position command. (command pulse accumulation) is 5-bit low. 4:Display position command. (command pulse accumulation) is 5-bit high. 5:Display position deviation is 5-bit low. 6:Display position deviation is 5-bit high. 7:Display motor torque. 8:Display motor current. 9:Display control mode. 10:Display temperature. 11:Display speed command.. 12:Display torque command. 13:Display absolute position of the rotor in a roll is 5-bit low. 14:Display absolute position of the rotor in a roll is 5-bit high. 15:Display input terminal state. 16:Display output terminal state. 17:Display encoder input signal. 18:Display voltage value of main line of main circuit. 19:Display alarming code. 20:Display logic chip version number. 21:Display the actuation state of the relay. 22:Display external voltage state. 23:Display external voltage state. 24:Absolute position 5-bit low. 25: Absolute position 5-bit high.	0-25	0

No.	Name	Function	Rang	Default Value
4	Control mode selection	To set control method: 0: position control mode 1: speed control mode 2: torque control mode 3:position + speed control mode 4:position + torque control mode 5:speed + torque control mode 6:encoder zeroing mode	0-6	0
5	Proportional gain of speed loop	1.Set the proportional gain of speed loop. 2.The value is bigger, the gain is higher and rigidity is stronger. The parameter value is set according to your exact servo driving system model and the load. Generally, the greater the load inertia, the bigger the value. 3.Please set a little high value if the system condition does not generate oscillation.	5-2000 Hz	150
6	Speed integral constant	1.To set the integral time constant of the speed loop regulator. 2.The value is smaller, the integral speed is faster and the servo rigidity is stronger.But if it is too small, it will happen over controlling.	1-1000 ms	75
7	Torque filter	1.To set the characters of torque command filter. 2.To suppress resonance generated by torque. 3.The value is smaller, the cut-off frequency is lower and vibration with noise generated by the motor is less. If the load inertia is great, reducing the setting value is recommended. If the value is too small, it would lead to low response, which would result in shaking. 4.The value is bigger, the cut-off frequency is higher and the response frequency is quicker. If	20-500%	100

		you need higher torque response frequency, it is recommended to increase the setting value.		
8	Speed detection filter	1. To set the characters of speed detection filter. 2. The value is smaller, the cut-off frequency is lower and noise from the motor is smaller. If the load inertia is great, reducing the setting value is recommended. If the value is too small, it would lead to low response, which would result in shaking. 3. The value is bigger, the cut-off frequency is higher and the response frequency is quicker. If you need higher torque response frequency, it is recommended to increase the setting value.	20-500%	200
9	Proportional gain of position loop	1.To set the proportional gain of position loop . 2.The value is bigger, the gain is higher and its rigidity is stronger. So the position lag is smaller under the same frequency command pulse condition. But if it is too big, it will happen oscillation. 3.The parameter value is set according to your exact servo driving system model and the load.	1-1000	80
10	Number of pulses output for each motor revolution	To set the number of pulses output by the encoder AB phase for each motor revolution.	100-30000	10000
11	Command pulses of each motor revolution	1.To set command pulses of each motor revolution. 2.When it is set to 0, PA12(numerator of electronic gear for position command pulses), PA13(denominator of electronic gear for position command pulses) are valid.	0-30000	10000

<table>
<tr>
<td>12</td>
<td>1st numerator of electronic gear for position command pulse</td>
<td>1.Set the electric gear ratio for position command pulse.
2.In position control mode,it is convenient to match all kinds of pulse source through set the parameter PA12 and PA13, which helps to reach ideal control resolution(angle/pulse).
3. P×G=N×C×4
P: pulses of input command; G:electric gear ratio; N:numbers of motor rotation ; C:solutions of photoelectric encoder in per rotation, the default value is 2500.
4.For example, input command pulse P is 6000, servo motor rotate a roll: G=(N×C×4)/P=(1×2500×4)/6000=5/3, So PA12 should be set to 5, PA13 should be set to 3.
5.The numerator of electronic gear for command pulse is decided by Gear1 and Gear2. The denominator is decided by PA13. The details as following:
<table>
<tr><th colspan="2">DI Signal</th><th rowspan="2">Denominator</th></tr>
<tr><th>Gear 2</th><th>Gear 1</th></tr>
<tr><td>0</td><td>0</td><td>1st Numerator(PA12)</td></tr>
<tr><td>0</td><td>1</td><td>2nd Numerator(PA77)</td></tr>
<tr><td>1</td><td>0</td><td>3rd Numerator(PA78)</td></tr>
<tr><td>1</td><td>1</td><td>4th Numerator(PA79)</td></tr>
</table>
Remark: 0=OFF, 1=ON.</td>
<td>0-32767</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>Denominator of position command pulse</td>
<td>Refers to parameter PA12.</td>
<td>1-32767</td>
<td>10000</td>
</tr>
</table>

14	Input mode of position command pulse	1.Set the input mode of position command pulse. 2.To set one of 4 input modes: 0: Pulse+Direction. 1: CCW pulse/CW pulse. 2: phase A and phase B orthogonal input. 3: Internal position input. Remark: CCW: observe from the motor axial direction. It defines CCW in counter clock wise and CW in clock wise.	0-3	0
15	Direction of command pulses	0:Normal direction. 1:Reverse position command pulse.	0-1	0
16	The rang of positioning completion	1.Setting the pulse range of positioning completion in position control mode. 2.The drive judges whether it has finished positioning completion based on this parameter. When the rest pulses in position deviation counter are less than or equal with the setting value, the COIN（positioning completion) of digital output(DO) is ON, or else OFF	0-30000pulses	130
17	Detection of over-travel range	1.Set alarming detection range of over travel.. 2.In position control mode, if the value in position deviation counter is over than the setting value, the drive will alarm.	0-30000×100 pulses	6000
18	Invalid over-travel error	Set to: 0: The alarming detection of over travel is valid. 1: The alarming detection of over travel is invalid, and it stops detecting the error .	0-1	0

No.	Name	Function	Rang	Default Value
19	Position command smooth filter	1.To filter the instruction pulse with exponential acceleration and deceleration, and the value represents the time constant. 2.The filter does not lose input pulses, but would occur command delay . 3.The filter applies in (1. PC controller without acceleration and deceleration function. (2. The electronic gear frequency is a little big(>10). (3.The command frequency is a little low. 4.When the motor runs, there are step jumps and unsteadiness. 5.When set to value"0", the filter does not work.	0-1000×0.1 ms	100
20	Invalid input of drive inhibition	To set: 0: CCW drive inhibition or CW drive inhibition is effective. If the switch of CCW drive inhibition is ON, CCW drive is permitted.If the switch of CCW drive inhibition is OFF, CCW torque keeps 0.The same as CW drive inhibition. If both CCW and CW drive inhibition are OFF, it will come to error alarms of drive inhibition input. 1: Cancel CCW or CW drive inhibition. No matter what state of the switch of CCW or CW drive inhibition is, CCW or CW drive is allowed.Meanwhile,if the switches of CCW and CW drive inhibition are OFF, it will still not alarm..	0-1	1
21	JOG speed	Set the running speed of JOG operating.	0-6000 r/min	100

<table>
<tr>
<td>22</td>
<td>The source of speed command</td>
<td>In speed control mode, it sets the source of speed command. It means:
0: Analog Terminal AS+,AS- input analog speed command.
1:Internal speed command is decided by SP1 and SP2 of digital input(DI):
<table>
<tr><th colspan="2">DI Signal</th><th rowspan="2">Speed Command</th></tr>
<tr><th>SP2</th><th>SP1</th></tr>
<tr><td>0</td><td>0</td><td>Internal Speed1(PA24)</td></tr>
<tr><td>0</td><td>1</td><td>Internal Speed2(PA25)</td></tr>
<tr><td>1</td><td>0</td><td>Internal Speed2(PA26)</td></tr>
<tr><td>1</td><td>1</td><td>Internal Speed2(PA27)</td></tr>
</table>
Note: 1=ON, 0=OFF.
2: Analog speed command+internal speed command:
<table>
<tr><th colspan="2">DI Signal</th><th rowspan="2">Speed Command</th></tr>
<tr><th>SP2</th><th>SP1</th></tr>
<tr><td>0</td><td>0</td><td>Analog Speed Command</td></tr>
<tr><td>0</td><td>1</td><td>Internal Speed2(PA25)</td></tr>
<tr><td>1</td><td>0</td><td>Internal Speed2(PA26)</td></tr>
<tr><td>1</td><td>1</td><td>Internal Speed2(PA27)</td></tr>
</table>
3: JOG speed command, if carries out JOG operation,it is needed to set.
4: Keyboard speed command, if carries out Sr operation,it needs to set the parameter.
5:IO terminal controls JOG operation.</td>
<td>0-5</td>
<td>0</td>
</tr>
<tr>
<td>23</td>
<td>Highest speed limit</td>
<td>Set the highest speed of the ac motor.
1.It doesn’t matter with rotating direction.
2.If the setting value is beyond of rated speed, the real highest speed is set as the rated speed.</td>
<td>0-6000r/min</td>
<td>5000</td>
</tr>
<tr>
<td>24</td>
<td>Internal speed selection 1</td>
<td>1.Set the internal speed 1.
2.In speed control mode(PA22=0), when SC1 and SC2 are OFF, internal speed 1 is the speed command.</td>
<td>-6000-6000 r/min</td>
<td>100</td>
</tr>
</table>

<table>
<tr><td>25</td><td>Internal speed selection 2</td><td>1.Set the internal speed 2.
2.In speed control mode(PA22=0), when SC1 is ON,while SC2 is OFF, internal speed 2 is the speed command.</td><td>-6000-6000 r/min</td><td>500</td></tr>
<tr><td>26</td><td>Internal speed selection 3</td><td>1.Set the internal speed 3.
2.In speed control mode(PA22=0), when SC1 is OFF,while SC2 is ON, internal speed 3 is the speed command.</td><td>-6000-6000 r/min</td><td>1000</td></tr>
<tr><td>27</td><td>Internal speed selection 4</td><td>1.Set the internal speed 4.
2.In speed control mode(PA22=0), when SC1 and SC2 are ON, internal speed 4 is the speed command.</td><td>-6000-6000 r/min</td><td>2000</td></tr>
<tr><td>28</td><td>Speed arrival</td><td>1.Set the detection timing of the speed arrival output.
When the servomotor speed surpasses this parameter, the digital output (DO) ASP (arrival speed) is ON, otherwise is OFF.
2.The comparator has hysteresis function set by PA87.
Detection is associated with 10 r/min hysteresis.
3.It also has the polarity setting function:
<table>
<tr><th>PA88</th><th>PA28</th><th>Comparator</th></tr>
<tr><td>0</td><td>＞0</td><td>No direction for speed</td></tr>
<tr><td rowspan="2">1</td><td>＞0</td><td>Only detect CCW speed</td></tr>
<tr><td>＞0</td><td>Only detect CW speed</td></tr>
</table></td><td>0-3000 r/min</td><td>3000</td></tr>
<tr><td>29</td><td>Gain of analog quantity torque command</td><td>1.Set the proportion for input voltage of analog torque and the actual motor running torque.
2. The setting value unit is 0.1v/100%.
3. The default value is 30, corresponding to 3v/100%, while it means if the input voltage is 3V, it would generate 100% rated torque.</td><td>10-100 (0.1v/100%)</td><td>30</td></tr>
<tr><td>30</td><td>The alarm value of torque</td><td>1.The value is the percentage of rated torque. The limit is independent to direction and CW or CCW direction is protected.</td><td>1-300</td><td>300</td></tr>
</table>

<table>
<tr><td></td><td>overload</td><td>2.When PA31＞9, motor torque＞PA30 and duration ＞PA31, the drive alarms and the code is Err-29. The motor stops working. It must power back on clear alarm.</td><td></td><td></td></tr>
<tr><td>31</td><td>The detection time for torque overload</td><td>1.The detection time for torque overload, unit:ms.
2.When set to 0, the torque overload alarm does not work.</td><td>0-32767</td><td>0</td></tr>
<tr><td>32</td><td>The source of torque command</td><td>In torque control mode, it sets the source of torque command. It means:
0:Analog torque command, it inputs by analog terminal AS+ and AS-.
1:Internal torque command, it is decided by TRO1 and TRQ2 of digital input(DI):
<table>
<tr><th colspan="2">DI Signal</th><th rowspan="2">Torque Command</th></tr>
<tr><th>TRQ2</th><th>TRQ1</th></tr>
<tr><td>0</td><td>0</td><td>Internal Torque1(PA64)</td></tr>
<tr><td>0</td><td>1</td><td>Internal Torque2(PA65)</td></tr>
<tr><td>1</td><td>0</td><td>Internal Torque3(PA66)</td></tr>
<tr><td>1</td><td>1</td><td>Internal Torque4(PA67)</td></tr>
</table>
Note: 0=OFF, 1=ON
2:Analog torque command+internal torque command:
<table>
<tr><th colspan="2">DI Signal</th><th rowspan="2">Torque Command</th></tr>
<tr><th>TRQ2</th><th>TRQ1</th></tr>
<tr><td>0</td><td>0</td><td>Analog Torque Command</td></tr>
<tr><td>0</td><td>1</td><td>Internal Torque2(PA65)</td></tr>
<tr><td>1</td><td>0</td><td>Internal Torque3(PA66)</td></tr>
<tr><td>1</td><td>1</td><td>Internal Torque4(PA67)</td></tr>
<tr><td></td><td></td><td></td></tr>
</table></td><td>0-1</td><td>0</td></tr>
</table>

33	The input direction of analog torque command	Reverse the input polarity of analog torque.	0-1	0
34	Internal CCW torque limit	1.The setting value is the percentage of rated torque.For example,it is set to 2 times of the rated torque, the value is 200. 2. At any time, this restriction is valid. 3. If the setting value is over than the max overload capacity, the actual torque limit is the max overload capacity that is permitted.	0-300%	300
35	Internal CW torque limit	1.The setting value is the percentage of rated torque.For example,it is set to 2 times of the rated torque, the value is 200. 2. At any time, this restriction is valid. 3. If the setting value is over than the max overload capacity, the actual torque limit is the max overload capacity that is permitted.	-300-0%	-300
36	External CCW torque limit	1.The setting value is the percentage of rated torque, for example, it is set to 1 time of rated torque, the value is 100. 2.Only when the input terminal(FIL) of CCW torque limit is ON is it valid. 3.When the limit is valid, the actual torque limit is the Minimum value of max overload capacity ,internal CCW torque limit and external CCW torque limit.	0-300%	100
37	External CW torque limit	Set external torque limit of the motor CW direction. 1.The setting value is the percentage of rated torque, for example, it is set to 1 time of rated torque, the value is -100. 2.Only when the input terminal(RIL) of CW torque	-300-0%	-100

		limit is ON is it valid. 3.When the limit is valid, the actual torque limit is the Minimum value of max overload capacity ,internal CCW torque limit and external CCW torque limit.		
38	Temperature alarm	Set drive temperature up to max limitation.	200-1350	
39	Zero offset compensation of analog torque command	Make an offset adjustment for analog torque command with this parameter.	-2000-2000	0
40	Acceleration time constant	The value means the motor of acceleration time from 0r/min to 1000r/min. 1.Linear acceleration and deceleration characteristics. 2.It only applies in speed control mode and internal position control mode, and other modes are invalid.	1-10000ms	100
41	Deceleration time constant	The value means the motor of deceleration time from 0r/min to 1000r/min. 1.Linear acceleration and deceleration characteristics. 2.It only applies in speed control mode and internal position control mode, and other modes are invalid.	1-10000ms	100
42	S type acceleration and deceleration time constant	It makes the motor start and stop working stably and sets a part of time of S type acceleration and deceleration curve.	0-1000ms	0

43	Gain of analog speed command	Set the proportion for analog speed input voltage and actual motor running speed.	10-3000 r/min/v	300
44	Direction of analog speed command	Reverse the input polarity of analog speed. 1. Set to 0 and analog speed command is positive,the speed direction is CCW. 2. Set to 1 and analog speed command is positive,the speed direction is CW.	0-1	0
45	Zero offset compensation of analog speed command	Make an offset adjustment for analog speed command with this parameter.	-5000-5000	0
46	Filter of analog speed command	1.The input low pass filter of analog speed 2.The setting value is bigger, the response frequency is quicker to speed input analog quantity and the influence of signal noise is louder.	1-1000 Hz	300
47	The setting of mechanical brake when the motor stops	1.It defines the delay time from BRK=ON and BRK=OFF to the motor current cutting off when the motor stops rotating. 2.To avoid a small displacement or working drop of the motor, the parameter should not be less than the delay time of mechanical braking.	0-2000ms	0
48	The setting of mechanical brake when the motor rotates	1.It defines the delay time from the motor current cutting off to BRK=ON and BRK=OFF when the motor rotates. 2.To avoid a damage to the brake, the parameter makes the motor slow down and then makes the mechanical brake work. 3. The actual action time is the time it takes to drop from PA48 or current motor speed to PA49, and	0-2000ms	500

		taking the minimum value.		
49	The working speed of the mechanical brake when the motor rotates	1. It defines the speed value from motor current cut-off to mechanical brake action (output terminal BRK from ON to OFF) during motor working. 2.The actual action time is the time it takes to drop from PA48 or current motor speed to PA49, and taking the minimum value.	0-3000 r/min	100
50	Speed limit in torque control mode	1:In torque control mode, the motor running speed is limited in the range of this parameter. 2:It can prevent over speed in light load.	0-5000 r/min	3000
53	Servo force enable	To set : 0: The enable signal is controlled by SON of digital input(DI). 1:Software force to servo on.	0-1	0
54	The delay closing time of servo enable	It defines the time to delay cutting off the motor current after the servo enable signal is turned off.	0-30000ms	0
55	Effective level control word of input terminals	1.To reverse the input terminals. For unreversed terminals, it is valid when the switch is closed, while it is invalid when the switch is open. For reversed terminals, it is invalid when the switch is closed, while it is valid when the switch is open. 2.Represented by a binary digit of 4 bits. If it is 0, it means the input terminal dose not reverse. While it is 1, it means the terminal reverses. The binary digit represents the input terminals as following:	00000000-11111111	00000000

<table>
<tr><td></td><td></td><td>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>DI 8</td><td>DI 7</td><td>DI 6</td><td>DI5</td><td>DI 4</td><td>DI 3</td><td>DI 2</td><td>DI 1</td></tr>
</table>
0: high level is active.
1: low level is active.
</td><td></td><td></td></tr>
<tr><td>57</td><td>Effective level control word of output terminals</td><td>1.To reverse the output terminals. For reversed terminals,the definitions of breaking over and cut-off is contrary to standard definitions
2.Represented by a binary digit of 4 bits. If it is 0, it means the input terminal dose not reverse. While it is 1, it means the terminal reverses.
The binary digit represents the input terminals as following:
<table>
<tr><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>DO6</td><td>DO5</td><td>DO4</td><td>DO3</td><td>DO2</td><td>DO1</td></tr>
</table>
0: high level is active.
1: low level is active.</td><td>000000-111111</td><td>000000</td></tr>
<tr><td>58</td><td>Removing jitter time constant of I/O input terminal</td><td>1.Set the removing jitter filter time for input terminal.
2.The value is smaller, the terminal input response frequency is quicker.
3.The value is bigger, the anti-jamming performance of input terminal is better, but the response frequency becomes slow.</td><td>1-20ms</td><td>2</td></tr>
<tr><td>59</td><td>Effective command pulse edge</td><td>Set to:
0: the rising edge is effective.
1:the falling edge is effective.</td><td>0-1</td><td>0</td></tr>
<tr><td>60</td><td>Soft reset</td><td>Set to:
0:Soft reset is invalid.
1:Soft reset is effective and the system will restart.</td><td>0-1</td><td>0</td></tr>
<tr><td>61</td><td>System alarm clear</td><td>Set to:
0: System alarm clear is invalid.
1: System alarm clear is effective.</td><td>0-1</td><td>0</td></tr>
</table>

62	Encoder selection	Set to: 0: incremental 2500-line encoder. 1:save-line encoder. 4: single-turn absolute encoder. 5: multi-turn absolute encoder. Remark: If change the absolute encoder to a save-line encoder, please set PA61=1 and repower on.	0，1，4，5	4
63	Load inertia ratio	Set the load inertia ratio of the motor rotating inertia. The setting value=((load inertia+rotating inertia) / rotating inertia)×100.	1-500	100
64	Internal Torque 1	In torque control mode(PA4=2), when TRQ1=OFF, TRQ2=OFF, internal torque 1 is as the torque command.	-300-300	0
65	Internal Torque 2	In torque control mode(PA4=2), when TRQ1=ON, TRQ2=OFF, internal torque 2 is as the torque command.	-300-300	0
66	Internal Torque 3	In torque control mode(PA4=2), when TRQ1=OFF, TRQ2=ON, internal torque 3 is as the torque command.	-300-300	0
67	Internal Torque 4	In torque control mode(PA4=2), when TRQ1=ON, TRQ2=ON internal torque 4 is as the torque command.	-300-300	0
71	MODBUS ID NO.	MODBUS communication address.	1-254	1
72	MODBUS communication baud rate	MODBUS communication baud rate.	48-1152×100	96
73	MODBUS protocol selection	0: 8, N, 2 (MODBUS, RTU) 1：8，E，1 （MODBUS, RTU) 2：8，O，1 （MODBUS, RTU) The parameter decide the communication protocol. Value 8 represents the transmitted data is 8 bits;	0-3	0

		N,E,O indicate odd or even: N: do not use this bit. E: it represents 1 is even bit. O: it represents 1 is odd bit. Value 1 or 2 indicates communication of 1 bit or 2 bits.		
74	Communication error handling	When communication happens error, if choose: 0: keep working. 1: alarm and stop working.	0-1	0
75	Zero-speed detection point	1.If the motor running speed is less than the value of this parameter, the ZSP(zero speed) of digital output(DO) is ON, or else OFF. 2.If ZCLAMP of digital input(DI) is ON and speed command is less than the value of this parameter, the value of speed command is forced to be zero.	0-1000 r/min	10
76	Speed coincidence range	When the difference between the actual speed and the instruction speed is less than this setting, the UCO2N(speed coincidence) is ON, otherwise OFF.	0-1000 r/min	10
77	2nd numerator of electronic gear for position command pulse	Refers to parameter PA12.	0-32767	0
78	3rd numerator electronic gear for position command pulse	Refers to parameter PA12.	0-32767	0

79	4th numerator of electronic gear for position command pulse	Refers to parameter PA12.	0-32767	0
80	Effective level of command direction signal	Set to: 0:High level is positive direction. 1:Low level is positive direction.	0-1	0
81	PULS signal filter of command pulse	1.To filter the input PULS signal. 2.The default value is the max pulse input frequency: 500KHz(kpps). The value is bigger, the max input frequency is slower. 3.To filter the noise from the signal line in order to avoid incorrect counting happening. If it goes wrong due to the incorrect counting, you can increase the value of this parameter properly. 4. After editing this parameter, please save it and recharge. Then it is effective.	0-7	4
82	Hardware filter selection	0: Select hardware filter; 1: Bypass hardware filter.	0-1	1
83	CWL/CCWL inhibit way	When the machine touches the mechanical limit switch and strike CW/CCW limit , you can choose the following methods to prohibit with this parameters. 0: To limit the torque in this direction to be 0. 1: To prohibit the input pulse in this direction.	0-1	0
84	Hysteresis for	1.Set pulse completion range in position control mode.	0-32767 pulse	65

<table>
<tr><td></td><td>positioning completion</td><td>2. when the number of remaining pulses in the position deviation counter is less than or equal to the setting value of this parameter, the digital output of COIN(position completion) is ON, otherwise OFF.
3.Comparator has the function of hysteresis, which is set by PA85.</td><td></td><td></td></tr>
<tr><td>85</td><td>The range of near position</td><td>1. To set the pulse range of near position under the position control mode.
2. When the pulse number in position deviation counter is smaller than or equal to the setting value of this parameter, the digital output (DO) NEAR(approach position) is ON, otherwise is OFF.
3. The comparator has hysteresis function set by PA86.
4.It is used for the host computer to receive NEAR signal to prepare for the next step when the positioning is about to be completed. Generally, the parameter value should be larger than the positioning completion range.</td><td>0-32767 pulse</td><td>6500</td></tr>
<tr><td>86</td><td>Hysteresis for approach+ positionig</td><td>Refer to parameter PA85.</td><td>0-32767 pulse</td><td>650</td></tr>
<tr><td>87</td><td>Hysteresis of arrival speed</td><td>1. When the motor speed exceeds this parameter, the digital output ASP (speed arrival) is ON, otherwise OFF.
2. The comparator has hysteresis function.
3. It has polarity setting function:
<table>
<tr><th>PA88</th><th>PA28</th><th>Comparator</th></tr>
<tr><td>0</td><td>>0</td><td>Speed without direction</td></tr>
<tr><td rowspan="2">1</td><td>>0</td><td>Only detect positive speed</td></tr>
<tr><td><0</td><td>Only detect reversal speed</td></tr>
</table></td><td>0-5000 r/min</td><td>30</td></tr>
<tr><td>88</td><td>Polarity of arrival speed</td><td>Refers to parameter PA87.</td><td>0-1</td><td>0</td></tr>
</table>

<table>
<tr><td>89</td><td>Arrival torque</td><td>1. When the motor torque exceeds this parameter, the digital output ATRQ (torque arrival) is ON, otherwise OFF.
2. The comparator has hysteresis function set by PA90.
3. It has polarity setting function:<table><tr><th>PA91</th><th>PA89</th><th>Comparator</th></tr><tr><td>0</td><td>>0</td><td>Torque without direction</td></tr><tr><td rowspan="2">1</td><td>>0</td><td>Only detect positive speed</td></tr><tr><td><0</td><td>Only detect reversal speed</td></tr></table></td><td>-300%-300%</td><td>100</td></tr>
<tr><td>90</td><td>Hysteresis of arrival torque</td><td>1.If the motor torque is bigger than PA90, the ATRQ(torque arrival) of digital output(DO) is ON, otherwise it is OFF.
2.The comparator has hysteresis function set by PA90.
3.It also has polarity setting function:<table><tr><th>PA91</th><th>PA89</th><th>Comparator</th></tr><tr><td>0</td><td>>0</td><td>Torque without direction</td></tr><tr><td rowspan="2">1</td><td>>0</td><td>Only detect positive speed</td></tr><tr><td><0</td><td>Only detect reversal speed</td></tr></table></td><td>0-300%</td><td>5</td></tr>
<tr><td>91</td><td>Polarity of arrival torque</td><td>1.If the motor torque is bigger than PA91, the ATRQ(torque arrival) of digital output(DO) is ON, otherwise it is OFF.
2.The comparator has hysteresis function and it is set by PA90.
3.It also has polarity setting function:<table><tr><th>PA91</th><th>PA89</th><th>Comparator</th></tr><tr><td>0</td><td>>0</td><td>Torque without direction</td></tr><tr><td rowspan="2">1</td><td>>0</td><td>Only detect positive speed</td></tr><tr><td><0</td><td>Only detect reversal speed</td></tr></table></td><td>0-1</td><td>0</td></tr>
<tr><td>92</td><td>Hysteresis of zero speed</td><td>1.The motor speed is lower than the value of this parameter, ZSP(zero speed) of digital output is ON, or else OFF.</td><td>0-1000 r/min</td><td>5</td></tr>
</table>

	detection	2.The comparator has hysteresis function.		
94	The delay time for the electromagnetic brake to open	1. Set the delay time of opening the electromagnetic brake. 2. When the system is from the non-enabled state to the enabled state, define the delay time from the opening of the motor current to the release of the electromagnetic brake (DO output terminal BRK ON).	0-2000 ms	0
95	Motor encoder resolution	Motor encoder resolution，2^{17}=13107 and the setting value 17. Please modify it carefully.	10-10000	17
96	Motor polarity	It is motor polarity. Please modify it carefully.	1-360	4
97	Motor zero offset Angle	The offset Angle between the encoder zero and the motor zero is determined by the motor.	0-3600	1800
99	Maximum duty cycle on brake	Maximum duty cycle on brake	5-90	50
100	Filter selection of position loop	0：digital moving average filter. 1：index smooth filter.	0-1	0
101	Position loop feedforward gain	Feedforward can reduce the position tracking error during position control. When set to 100, the position tracking error is always 0 under any frequency of command pulses.	0-100	0
102	Position loop feedforward filtering time constant	Position loop feedforward filtering increases the stability of feedforward control variables.	20-500	100

103	Z signal output pulse width	Z signal width.	1-200	50
104	RS output function selection	Set to: 0: Can use 485 communication function; 1: No 485 communication function, add a programmable output, output differential signal (default is Z signal).	0-1	0
107	line saving encoder zero offset Angle	When PA62=1, using a line saving motor, this parameter determines the encoder zero offset Angle.	0-3600	1800
108	Multi-circle information error alarm detection	Set to: 0:Enable multi-circle information error alarm detection. 1: Shield multi-circle information error alarm detection.	0-1	0
111	Level of voltage relief and overvoltage handling mechanism	To modify the parameter to non-zero value, it is necessary to access the appropriate external brake resistance. As the digital increases the sensitivity of the overvoltage alarm decreases, 5 is the shielded overvoltage alarm.	0-5	0
112	Bus voltage establishment completion delay	The bus voltage is set to establish the waiting delay for completion, and the appropriate increase of the parameter is conducive to the full charging of the energy and then the servo enters the state of conforming to the enabled state.	0-5000ms	0
113	AC undervolta	Set to: 0: Turn off AC undervoltage immediately turn off enable.	0-1	0

	ge immediately disables	1: Enable AC undervoltage and immediately turn off the enable.		
114	Turn off the relay delay	Set the delay time of dynamic braking closing relay.	5-3000ms	10
115	Voltage legal fault-free failure whether to turn off the relay	Relay action processing with servo shutdown enabled without alarm 0: The relay is not turned off. 1: Turn off the relay.	0-1	0
117	Command torque threshold for power line disconnection alarm (percentage of rated torque)	Command torque greater than the threshold value is one of the judging conditions for power line disconnection alarm. Increasing the parameter can reduce the sensitivity of alarm detection, and decreasing the sensitivity of alarm detection can improve the sensitivity of alarm detection.	50-300%	80
118	Feedback torque threshold for power line disconnection alarm (percentage of rated torque)	The feedback torque less than this threshold is used as one of the judgment conditions for the power line disconnection alarm. Decreasing the parameter reduces the sensitivity of alarm detection, while increasing the parameter increases the sensitivity of alarm detection.	0-300%	35
119	Speed	The current speed less than this threshold is used as one of	1-100%	25

	threshold for power line disconnection alarm (percentage of rated speed)	the judgment conditions for the power line disconnection alarm.		
120	Power line disconnection alarm time	Parameters PA117,PA118, and PA119 correspond to the time when the threshold meets the condition. Set to 0 to shield power line disconnect alarm detection.	0-30000ms	8
121	The drive will power down quickly when powered off	The driver is powered off without alarm. 0: Fast power down is not enabled. 1: Enable quick power down.	0-1	0
122	First power-on relay opening mechanism	When the bus voltage is detected at DC280V for 200ms for the first power-on, the relay is turned on and the voltage is considered to be established. If the voltage is not established for 3 seconds, the alarm Err46 is underpowered. 0: Not enabled. 1: Enable.	0-1	1

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	Default 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
P3-4	Digital Input DI5 Function	0-99	0
P3-5	Digital Input DI6 Function	0-99	0
P3-13	Low 16-bit current position value	-32768 - 32767	0
P3-14	High 16-bit current position value	-32768 - 32767	0
P3-15	Digital Input DI forced effective1	00000000-11111111	00000000
P3-16	Digital Input DI forced effective2	00000000-11111111	00000000
P3-17	Digital Input DI forced effective3	00000000-11111111	00000000
P3-18	Digital Input DI forced effective4	00000000-11111111	00000000
P3-19	Digital Input DI forced effective5	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
P3-24	Digital Output DO5 Function	0-99	18
P3-30	Virtual Input Terminal Control	0-2	0
P3-31	The State Value Of Virtual Input Terminal	00000000-11111111	00000000

P3-32	The display mode of motor position, command position, position difference and single-turn absolute position.	0: Motor resolution display increment; 1: Motor resolution shows absolute position; 2: Upper computer (PA11) resolution display increment; 3: Upper computer resolution displays absolute position.	0
P3-33	The State Value Of Virtual Output Terminal	0000-1111	0000
P3-34	Reset zeroing encoder multi-turn data	0-1	0
P3-35	Clear encoder fault alarm	0-1	0
P3-36	The current position is the zero point of the single lap position	0-1	0
P3-37	0: Single-turn + multi-turn position overall 64-bit data 1: divided into single-turn position and multi-turn position	0-1	0
P3-38	Virtual I/O Input DI1 Function	0-99	0
P3-39	Virtual I/O Input DI2 Function	0-99	0
P3-40	Virtual I/O Input DI3 Function	0-99	0
P3-41	Virtual I/O Input DI4 Function	0-99	0
P3-42	Virtual I/O Input DI5 Function	0-99	0

P3-43	Virtual I/O Input DI6 Function	0-99	0
P3-44	Virtual I/O Input DI7 Function	0-99	0
P3-45	Virtual I/O Input DI8 Function	0-99	0
P3-47	0: All enable control modes can modify the enable state. Non-zero value: Enable state can only be modified through 485, and enable state cannot be modified by DI input or pressing the key to set PA-53,P3-15Bit0.	0-30000	0

Remark:

1. P3-30=0, the number of IO input is 4 decided by DI1~DI4 and the corresponding parameter P3-0~P3-3;

2. P3-30=1, the number of IO input is 8 decided by P3-31 and the corresponding parameter P3-38~P3-45;

3. P3-30=2, the number of IO input is 12 decided by DI1~DI4 and P3-31 and the corresponding parameter P3-0~P3-3 and P3-38~P3-45.

4. For P3-24, when PA104=1, this port can be set as the differential output port.

7.2.2 DI Function Explanation

Input terminals(4 input terminals are corresponding to the definitions of P3-0~P3-7).

Value	Symbol	Function	Explanation
0	NULL	No	Input state dose not effect system.
1	SON	Servo Enable	Input terminal of servo enable. OFF: servo driver can not be enabled and servo motor is not excited. ON:servo driver is enabled and servomotor is excited.
2	ARST	Alarm Clear	Input terminal of alarm clearance. When an alarm occurs and if the alarm is allowed clearance, the rising edge(from OFF becomes ON) of ARST will clear the alarm. Attention: only a part of alarms are allowed to clear.
3	CCWL	CCW Drive Inhibition	1.Input terminal of CCW drive inhibition: OFF：Inhibit CCW running. ON：Enable CCW running. 2.Use this function for protection of the mechanical traveling limit.The function is controlled by the parameter PA20. Pay attention to that the default value of PA20 neglects this function.Therefore needs to modify PA20 if need to use this function: (1)：When PA20=0，the function of input inhibition is effective. Whether to inhibit is decided by PA83. (2)：When PA20=1, the function of input inhibition is not effective. Whether to inhibit is not decided by PA83 3.Inhibition function is valid(PA20=0): (1) PA83=0, CCW torque limit is 0,but it does not limit CCW pulse input. (2) PA83=1, it does not inhibit CCW pulse input.
4	CWL	CW Drive Inhibition	1.The input terminal of CW drive inhibition OFF：Inhibit CCW running. ON：Enable CW running.

			2.Use this function for protection of the mechanical traveling limit.The function is controlled by the parameter PA20. Pay attention to that the default value of PA20 neglects this function.Therefore needs to modify PA20 if need to use this function: (1)：When PA20=0，the function of input inhibition is effective. Whether to inhibit for CW is decided by PA83. (2)：When PA20=1, the function of input inhibition is not effective. Whether to inhibit for CW is not decided by PA83 3.Inhibition function is valid(PA20=0): (1)：PA83=0, CW torque limit is 0,but it does not limit CW pulse input. PA83=1, it does not inhibit CW pulse input.
5	TCCW	CCW Torque Limitation	OFF：Torque is not limited by parameter PA36 in CCW direction. ON ： Torque is limited by parameter PA36 in CCW direction. Attention: Whether the TCCW is effective or not, the torque is also limited by PA34 in CCW direction.
6	TCW	CW Torque Limitation	OFF：Torque is not limited by parameter PA37 in CW direction. ON ： Torque is limited by parameter PA37 in CW direction. Attention: Whether the TCW is effective or not, the torque is also limited by PA35 in CW direction.
7	ZCLAMP	Zero Speed Clamping	When it is satisfied with the followings, the function of zero speed clamping is open(speed is forced to zero): 1: speed control mode(PA4=1), and choose external speed(PA22=0); 2：ZCLAMP ON; 3：speed command is lower than the value of PA75

			When any one of the above conditions is not satisfied, it will perform normal speed control.
8	CZERO	Zero Command	In speed or torque control mode, speed or torque command: OFF：Normal command ON:：Zero command
9	CINV	Instruction Reverse	In speed or torque control mode, speed or torque command: OFF：Normal command ON：Command reversed
10	SP1	Speed Choice 1	In speed control mode(PA4=1), and choose internal speed(PA22=1). SP1 and SP2 combinations are used to select different internal speeds: SP2 OFF SP1 OFF: internal speed 1PA-24) SP2 OFF SP1 ON: internal speed 2(PA-25) SP2 ON SP1 OFF:internal speed 3(PA-26) SP2 ON SP1 ON:internal speed 4(PA-27)
11	SP2	Speed Choice 2	
13	TRQ1	Torque Choice 1	In torque control mode(PA4=2), and choose internal torque(PA32=1). TRQ1 and TRQ2 combinations are used to select different internal torque: TRQ2 OFF TRQ1 OFF: internal torque1(PA64) TRQ2 OFF TRQ1 ON: internal torque2(PA65) TRQ2 ON TRQ1 OFF: internal torque3(PA66) TRQ2 ON TRQ1 ON: internal torque4(PA67)
14	TRQ2	Torque Choice 2	
16	CMODE	Composite Mode	1.When PA4 is set to 3, 4, 5, it is in mix control mode. It can change control mode with this input terminal: (1)PA4=3, CMODE OFF, it is position control mode; CMODE ON, it is speed control mode; (2)PA4=4, CMODE OFF, it is position control mode; CMODE ON, it is torque control mode; (3)PA4=5, CMODE OFF, it is speed control mode; CMODE ON, it is torque control mode.

			2.When PA4 is set to 0,1, 2.It can change control mode with this input terminal: (1)PA-14=0, CMODE OFF, pulse + direction; CMODE ON is internal position instruction; (2)PA-14=1, CMODE OFF, CW pulse /CCW pulse; CMODE ON is internal position instruction; (3)PA-14=2, CMODE OFF, A, B two-phase orthogonal pulse input control; CMODE ON is internal position instruction;
18	GEAR1	Electronic Gear 1	When PA11=0, Gear1 and Gear2 combinations are used to select different numerator of gear ratio: GEAR2 OFF GEAR1 OFF: numerator 1(PA-12) GEAR2 OFF GEAR1 ON: numerator 2 (PA-77) GEAR2 ON GEAR1 OFF: numerator 3(PA-78) GEAR2 ON GEAR1 ON: numerator 4(PA-79)
19	GEAR2	Electronic Gear 2	
20	CLR	Position Deviation Clear	In position control mode, the position deviation counter clear input terminals.
21	INH	Pulse Input Inhibition	In position control mode, position command pulse inhibit terminals: OFF: The input command pulse is valid. ON : The input command pulse is prohibited.
22	JOGP	CCW Inching	In speed control mode, PA22=5, connect to the signal, the motor is in inching in CCW and speed is set by PA21. Attention: If the signal is connected to CW inching, inching function does not work.
23	JOGN	CW Inching	In speed control mode, PA22=5, connect to the signal, the motor is in inching in CW and speed is set by PA21. Attention: If the signal is connected to CCW inching, inching function does not work.
27	HOLD	Internal Position Control Command Stops	In internal position register mode, the motor will stop rotating if the signal is active(It can only work when internal position mode PA-14=3).

<table>
<tr><td>28</td><td>CTRG</td><td>Internal Position Command Triggers</td><td>In internal position register mode, the signal will be triggered once the internal position register control commands(POS0-2) are chosen, and then the motor will rotate according to the internal position register command. Only when ZSPD=1(digital output) it would receive a next internal position command trigger.</td></tr>
<tr><td>29</td><td>POS0</td><td>Internal Position Command Selection0</td><td rowspan="3">The corresponding relationship of the internal position selection:
<table>
<tr><th>Position Command</th><th>POS2</th><th>POS1</th><th>POS0</th><th>CTRG</th><th>Parameter</th></tr>
<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>
</table></td></tr>
<tr><td>30</td><td>POS1</td><td>Internal Position Command Selection1</td></tr>
<tr><td>31</td><td>POS2</td><td>Internal Position Command Selection2</td></tr>
<tr><td>33</td><td>SHOM</td><td>Starting Origin Regression</td><td>In internal position register mode,it needs to search for origin. The signal turns on and starts searching for the origin function(Refer to the setting of P4-34).</td></tr>
<tr><td>34</td><td>ORGP</td><td>Origin Of</td><td>In internal position register mode,it needs to search for</td></tr>
</table>

<table>
<tr><td></td><td></td><td>Regression</td><td>origin. The signal turns on and starts searching for the origin function(Refer to the setting of P4-32).</td></tr>
<tr><td>37</td><td>SLADR0</td><td>Modbus slave number Choice 0</td><td rowspan="4">Modbus slave selects the corresponding relationship with the machine number:
<table><tr><th>SLADR3</th><th>SLADR2</th><th>SLADR1</th><th>SLADR0</th><th>Slave number</th></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0 (broadcasting)</td></tr><tr><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>0</td><td>0</td><td>1</td><td>0</td><td>2</td></tr><tr><td>...</td><td>...</td><td>...</td><td>...</td><td>...</td></tr><tr><td>1</td><td>1</td><td>1</td><td>0</td><td>14</td></tr><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>15</td></tr></table></td></tr>
<tr><td>38</td><td>SLADR1</td><td>Modbus slave number Choice 1</td></tr>
<tr><td>39</td><td>SLADR2</td><td>Modbus slave number Choice 2</td></tr>
<tr><td>40</td><td>SLADR3</td><td>Modbus slave number Choice 3</td></tr>
</table>

7.2.3 DO Function Explanation

Output terminals(4 input terminals are corresponding to the definitions of P3-20~P3-25).

Value	Symbol	Function	Explanation
1	ON	Always Valid	Forced output ON.
2	RDY	Servo Ready	OFF ： Main power supply is off, or alarm occurs; ON：Main power supply is normal, no alarm occurs
3	ALM	Alarm	OFF ： alarm occurs. ON ： no alarm occurs.
4	ZSP	Zero Speed	In speed or torque control mode: OFF：motor speed is higher than the value of PA75 (no direction). ON：motor speed is higher than the value of PA75 (no direction).
5	COIN	Positioning Completion	In position control mode: OFF:position deviation is bigger than parameter PA16. ON: position deviation is bigger than parameterPA16.
6	ASP	Arrival Speed	In speed or torque control mode: OFF :motor speed is lower than parameter PA28. ON : motor speed is higher than parameterPA28. Polarity function can be set referring to the explanation of PA28.
7	ATRQ	Arrival Torque	OFF : motor torque is lower than parameter PA89; ON : motor torque is higher than parameter PA89. Polarity function can be set referring to the explanation of PA89.
8	BRK	Electromagnetic Brake	OFF : electromagnetic brake applies the brake. ON : electromagnetic brake releases the brake.
9	RUN	Servo Running	OFF : servo motor does not excite. ON : servo motor has excited.
10	NEAR	Near Position	In position control mode: OFF: position deviation is bigger than parameter PA85. ON: position deviation is smaller than parameter

			PA85.
11	TRQL	Torque Limitation	OFF : motor torque has not reached the limitation. ON : motor torque has reached the limitation. Torque limitation is set byPA34,PA35,PA36 and PA37.
12	SPL	Speed Limitation	In torque control mode: OFF : motor speed has not reached the limitation. ON : motor speed has reached the limitation. Speed limitation is set byPA50.
13	VCOIN	Speed Consistency	OFF: The absolute value of the difference between the actual rotational speed and the instruction speed is bigger than PA76. ON: The absolute value of the difference between the actual rotational speed and the instruction speed is smaller than PA76.
15	HOME	Origin Regression Completion	OFF: No signal output when the origin regression doesn't complete. ON: The signal outputs when the origin regression completes.
16	CMDOK	Internal Position Command Completion	OFF: No signal output when internal position command doesn't complete or internal position command doesn't stop. ON: The signal outputs after the setting time of P4-1 when internal position command completes or internal position command stops.
18	ZOUT	Z Signal Output	OFF: No signal output when Z signal is invalid. ON: The signal outputs when Z signal is valid.

7.2.4 DI Forced Valid

There are 5 parameters(P3-15, P3-16, P3-17,P3-18,P3-19) in group P3 and they can force DI valid.

(1) Corresponding functions for P3-15 is represented by 8-bit binary:

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

(2) Corresponding functions for P3-16 is represented by 8-bit binary:

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

(3) Corresponding functions for P3-17 is represented by 8-bit binary:

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

(4) Corresponding functions for P3-18 is represented by 8-bit binary:

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

(5) Corresponding functions for P3-19 is represented by 8-bit binary:

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

Parameter Meaning:

One of 5 parameters	Corresponding Function	Result
0	Unplanned	OFF（invalid）
	Already Planned	It is up to signals
1	Unplanned Or Already Planned	ON（forced valid）

◆ Being planned means that the parameter has been selected by the input terminal in the P3-0~P3-3.

7.3 P4 Group Parameters For Internal Position Command

No.	Name	Function	Rang	Default Value
P4-0	Internal position instruction control mode	0: absolute position instruction,suitable for PA62=5 multi-turn encoder mode. 1: incremental position instruction. 2:absolute position instruction,suitable for PA62=4 single-turn encoder mode.	0-2	0
P4-1	The digital output delay of internal position completion	1. When the internal position command is completed or stops,the output internal position command completes (CMDOK) this DO signal after the delay time set by P4-1. 2. Only when the delay time P4-1=0 and CMDOK=1 can it receive trigger internal position command. 3. Only when the delay time P4-1 is not 0 and CMDOK=1 can it receive the internal position command triggered by CTRG.	0-200 ms	0
P4-2	The setting of position cycle numbers for internal position command 1	To set position cycles of the 1st internal position.	-30000-30000	0
P4-3	The setting of pulse number in position cycle for internal position command 1	1. To set position pulses of the 1st internal position. 2. Internal position instruction 1=the setting value of the 1st internal position cycles+the setting value of the 1st internal position pulses. (Max is the pulse number of the motor rotation for each roll, please refer to the settings of PA11,PA12 and PA13).	+/- max.cnt/ rev	0

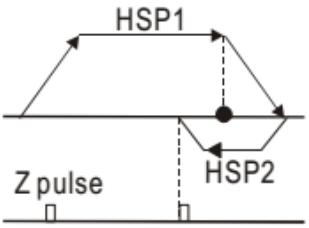
P4-4	The move speed of Internal position instruction 1	To set the move speed of internal position instruction 1.	0-5000 r/min	1000
P4-5	The number of position cycles of internal position instruction 2	To set the number of position cycles of the 2nd stage internal position.	-30000-30000	0
P4-6	The pulse number setting in position loop of internal position instruction 2	1. To set the position pulses of the 2nd stage internal position. 2. Internal position instruction 2=the position cycles setting of the 2nd internal position+the pulse number setting of the 2nd internal position.	+/- max.cnt/ rev	0
P4-7	The move speed of internal position instruction 2	To set the move speed of internal position instruction 2.	0-5000 r/min	1000
P4-8	The position cycles of internal position instruction 3	To set the position cycles of the3rd stage internal position instruction.	-30000-30000	0
P4-9	The pulse number setting in position loop of internal	1. To set the position pulses of the 3rd stage internal position. 2. Internal position instruction 3=the position cycles setting of the 3rd internal position+the pulse number setting of the 3rd internal position.	+/- max.cnt/ rev	0

	position instruction 3			
P4-10	The move speed of internal position instruction 3	To set the move speed of internal position instruction 3.	0-5000 r/min	1000
P4-11	The number of position cycles of internal position instruction 4	To set the number of position cycles of the 4th stage internal position.	-30000-30000	0
P4-12	The pulse number setting in position loop of internal position instruction 4	1. To set the position pulses of the 4th stage internal position. 2. Internal position instruction 4=the position cycles setting of the 4th internal position+the pulse number setting of the 4th internal position.	+/- max.cnt/ rev	0
P4-13	The move speed of internal position instruction 4	To set the move speed of internal position instruction 4.	0-5000 r/min	1000
P4-14	The position cycles of internal position instruction 5	To set the position cycles of the5th stage internal position instruction.	-30000-30000	0

P4-15	The pulse number setting in position loop of internal position instruction 5	1. To set the position pulses of the 5th stage internal position. 2. Internal position instruction 5=the position cycles setting of the 5th internal position+the pulse number setting of the 5th internal position.	+/- max.cnt/ rev	0
P4-16	The move speed of internal position instruction 5	To set the move speed of internal position instruction 5.	0-5000 r/min	1000
P4-17	The number of position cycles of internal position instruction 6	To set the number of position cycles of the 6th stage internal position.	-30000-30000	0
P4-18	The pulse number setting in position loop of internal position instruction 6	1. To set the position pulses of the 6th stage internal position. 2. Internal position instruction 6=the position cycles setting of the 6th internal position+the pulse number setting of the 6th internal position.	+/- max.cnt/ rev	0
P4-19	The move speed of internal position instruction 6	To set the move speed of internal position instruction 6.	0-5000 r/min	1000

P4-20	The position cycles of internal position instruction 7	To set the position cycles of the 7th stage internal position instruction.	-30000-30000	0
P4-21	The pulse number setting in position loop of internal position instruction 7	1. To set the position pulses of the 7th stage internal position. 2. Internal position instruction 7=the position cycles setting of the 7th internal position+the pulse number setting of the 7th internal position.	+/-max.cnt/rev	0
P4-22	The move speed of internal position instruction 7	To set the move speed of internal position instruction 7.	0-5000 r/min	1000
P4-23	The number of position cycles of internal position instruction 8	To set the number of position cycles of the 8th stage internal position.	-30000-30000	0
P4-24	The pulse number setting in position loop of internal position instruction 8	1. To set the position pulses of the 8th stage internal position. 2. Internal position instruction 8=the position cycles setting of the 8th internal position+the pulse number setting of the 8th internal position.	+/-max.cnt/rev	0

P4-25	The move speed of internal position instruction 8	To set the move speed of internal position instruction 8.	0-5000 r/min	1000
P4-32	The type of origin detector and setting of finding direction	0: Forward direction origin regression and CCWL is as regression origin. 1: Reverse direction origin regression and CWL is as regression origin. 2: Forward direction origin regression and ORGP is as regression origin. 3: Reverse direction origin regression and ORGP is as regression origin. 4: Forward looking for Z pulse as the origin of regression. 5: Reverse looking for Z pulse as the origin of regression.	0-5	0
P4-33	Set the mode of short distance movement to the origin	0: After finding the reference origin, return to find the absolute position zero of one lap as the mechanical origin; 1: Do not return after finding the reference origin, but look forward for the absolute position zero of one lap as the mechanical origin; 2: After finding the reference origin (ORGP rising edge or single lap absolute position zero) as the mechanical origin, the deceleration stops.	0-2	0
P4-34	The setting of origin stop mode	0: The motor slows down and pulls back to the origin when the origin detection completed. 1: The motor slows forward and stops when the origin detection completed.	0-2	0

P4-35	The setting of origin stop mode	0: The motor slows down and pulls back to the origin when the origin detection completed. 1: The motor slows forward and stops when the origin detection completed.	0-1	0
P4-36	The speed setting of origin regress in the first stage of high speed (HSPD1)	To set homing speed at 1st stage. 	1-2000 r/min	1000
P4-37	The speed setting of origin regress in the second stage of high speed(HSPD2)	To set the speed of origin regression in the second stage of high speed.	1-500 r/min	50
P4-38	The cycle number of origin regression offset(HOF1)	To set the cycle number of origin regression offset.	-30000-30000	0
P4-39	The pulse number of origin regression offset(HOF2)	1: To set the pulse number of origin regression offset. 2: When the parameter function HOF1 and HOF2 are set to 0, the origin is defined as Z pulse or ORGP by the origin regression mode. If they are not 0, the origin will define the above Z pulse plus last pulse offset HOF1 ×10000+HOF2 as the new origin.	+/- max.cnt/ rev	0
P4-40	The number of position cycles of internal position	To set the number of position cycles of the 9th stage internal position.	-30000-30000	0

	instruction 9			
P4-41	The pulse number setting in position loop of internal position instruction 9	1.To set the position pulses of the 9th stage internal position. 2.Internal position instruction 9=the position cycles setting of the 9th internal position+the pulse number setting of the 9th internal position.(Max is the set number of pulses per turn of the motor, please refer to the setting of PA-11 PA-12 PA-13).	+/-max.cnt/rev	0
P4-42	The move speed of internal position instruction 9	To set the move speed of internal position instruction 9.	0-5000 r/min	1000
P4-43	The number of position cycles of internal position instruction 10	To set the number of position cycles of the 10th stage internal position.	-30000-30000	0
P4-44	The pulse number setting in position loop of internal position instruction 10	1.To set the position pulses of the 10th stage internal position. 2.Internal position instruction 10=the position cycles setting of the 10th internal position+the pulse number setting of the 10th internal position(Max is the set number of pulses per turn of the motor, please refer to the setting of PA-11 PA-12 PA-13).	+/-max.cnt/rev	0

P4-45	The move speed of internal position instruction 10	To set the move speed of internal position instruction 10.	0-5000 r/min	1000
P4-46	The number of position cycles of internal position instruction11	To set the number of position cycles of the 11th stage internal position.	-30000-30000	0
P4-47	The pulse number setting in position loop of internal position instruction 11	1.To set the position pulses of the 11th stage internal position. 2.Internal position instruction 11=the position cycles setting of the 11th internal position+the pulse number setting of the 11th internal position(Max is the set number of pulses per turn of the motor, please refer to the setting of PA-11 PA-12 PA-13).	+/- max.cnt/ rev	0
P4-48	The move speed of internal position instruction 11	To set the move speed of internal position instruction 11.	0-5000 r/min	1000
P4-49	The number of position cycles of internal position instruction12	To set the number of position cycles of the 12th stage internal position.	-30000-30000	0

P4-50	The pulse number setting in position loop of internal position instruction 12	1.To set the position pulses of the 12th stage internal position. 2.Internal position instruction 12=the position cycles setting of the 12th internal position+the pulse number setting of the 12th internal position(Max is the set number of pulses per turn of the motor, please refer to the setting of PA-11 PA-12 PA-13).	+/-max.cnt/rev	0
P4-51	The move speed of internal position instruction 12	To set the move speed of internal position instruction 12.	0-5000 r/min	1000
P4-52	The number of position cycles of internal position instruction13	To set the number of position cycles of the 13th stage internal position.	-30000-30000	0
P4-53	The pulse number setting in position loop of internal position instruction 13	1.To set the position pulses of the 13th stage internal position. 2.Internal position instruction 13=the position cycles setting of the 13th internal position+the pulse number setting of the 13th internal position(Max is the set number of pulses per turn of the motor, please refer to the setting of PA-11 PA-12 PA-13).	+/-max.cnt/rev	0

P4-54	The move speed of internal position instruction 13	To set the move speed of internal position instruction 13.	0-5000 r/min	1000
P4-55	The number of position cycles of internal position instruction14	To set the number of position cycles of the 14th stage internal position.	-30000-30000	0
P4-56	The pulse number setting in position loop of internal position instruction 14	1.To set the position pulses of the 14th stage internal position. 2.Internal position instruction 14=the position cycles setting of the 14th internal position+the pulse number setting of the 14th internal position(Max is the set number of pulses per turn of the motor, please refer to the setting of PA-11 PA-12 PA-13).	+/- max.cnt/ rev	0
P4-57	The move speed of internal position instruction 14	To set the move speed of internal position instruction 14.	0-5000 r/min	1000
P4-58	The number of position cycles of internal position instruction15	To set the number of position cycles of the 15th stage internal position.	-30000-30000	0

P4-59	The pulse number setting in position loop of internal position instruction 15	1.To set the position pulses of the 15th stage internal position. 2.Internal position instruction 15=the position cycles setting of the 15th internal position+the pulse number setting of the 15th internal position(Max is the set number of pulses per turn of the motor, please refer to the setting of PA-11 PA-12 PA-13).	+/- max.cnt/ rev	0
P4-60	The move speed of internal position instruction 15	To set the move speed of internal position instruction 15.	0-5000 r/min	1000
P4-61	The number of position cycles of internal position instruction16	To set the number of position cycles of the 16th stage internal position.	-30000-30000	0
P4-62	The pulse number setting in position loop of internal position instruction 16	1.To set the position pulses of the 16th stage internal position. 2.Internal position instruction 16=the position cycles setting of the 16th internal position+the pulse number setting of the 16th internal position(Max is the set number of pulses per turn of the motor, please refer to the setting of PA-11 PA-12 PA-13).	+/- max.cnt/ rev	0

P4-63	The move speed of internal position instruction 16	To set the move speed of internal position instruction 16.	0-5000 r/min	1000
P4-64	Delay of internal position instruction 1	The delay to execute the next internal location instruction after completion of internal location instruction 1.	0-30000 ms	0
P4-65	Delay of internal position instruction 2	The delay to execute the next internal location instruction after completion of internal location instruction 2.	0-30000 ms	0
P4-66	Delay of internal position instruction 3	The delay to execute the next internal location instruction after completion of internal location instruction 3.	0-30000 ms	0
P4-67	Delay of internal position instruction 4	The delay to execute the next internal location instruction after completion of internal location instruction 4.	0-30000 ms	0
P4-68	Delay of internal position instruction 5	The delay to execute the next internal location instruction after completion of internal location instruction 5.	0-30000 ms	0
P4-69	Delay of internal position instruction 6	The delay to execute the next internal location instruction after completion of internal location instruction 6.	0-30000 ms	0

P4-70	Delay of internal position instruction 7	The delay to execute the next internal location instruction after completion of internal location instruction 7.	0-30000 ms	0
P4-71	Delay of internal position instruction 8	The delay to execute the next internal location instruction after completion of internal location instruction 8.	0-30000 ms	0
P4-72	Delay of internal position instruction 9	The delay to execute the next internal location instruction after completion of internal location instruction 9.	0-30000 ms	0
P4-73	Delay of internal position instruction 10	The delay to execute the next internal location instruction after completion of internal location instruction 10.	0-30000 ms	0
P4-74	Delay of internal position instruction 11	The delay to execute the next internal location instruction after completion of internal location instruction 11.	0-30000 ms	0
P4-75	Delay of internal position instruction 12	The delay to execute the next internal location instruction after completion of internal location instruction 12.	0-30000 ms	0
P4-76	Delay of internal position instruction 13	The delay to execute the next internal location instruction after completion of internal location instruction 13.	0-30000 ms	0

P4-77	Delay of internal position instruction 14	The delay to execute the next internal location instruction after completion of internal location instruction 14.	0-30000 ms	0
P4-78	Delay of internal position instruction 15	The delay to execute the next internal location instruction after completion of internal location instruction 15.	0-30000 ms	0
P4-79	Delay of internal position instruction 16	The delay to execute the next internal location instruction after completion of internal location instruction 16.	0-30000 ms	0
P4-80	Internal position loop mode function selection	0: Internal position mode controlled by input signal; 1: Internal position mode is controlled by the internal instructions of the drive.	0-1	0
P4-81	The starting internal position instruction segment number of the loop execution	Non-0 values are valid. Instructions at internal positions up to this value are executed only once, and instructions up to this value and beyond are looped. It can be used in combination with the P4-82 to allow the machine to circulate back and forth in the starting and ending ranges.	0-15	0
P4-82	Internal position instruction segment number at the end of the loop	This parameter is used as the end segment number of the loop execution, and after reaching this segment number, the next loop starts from the start segment number. It can be used in combination with the P4-81 to allow the machine to circulate back and forth in the starting and ending ranges.	1-15	15

	execution			
P4-83	The number of loop executions of internal position instructions	0: infinite loop; Non-0 value: Stop after executing the corresponding number of times.	0-30000	0
P4-84	The internal position instruction segment number that eventually stops after a finite number of loops	This parameter is valid when P4-83 has a nonzero value. After the number of cycles reaches the value of P4-83, the machine will eventually run to the corresponding segment number of this parameter and then stop.	0-15	15

Chapter 8 Error Code

No.	Error Name	Introduction
--	Normal	
1	Over speed	Motor speed over than the setting values.
2	Main circuit over voltage	The voltage of main circuit is too high.
3	Main circuit under voltage	The voltage of main circuit is too low.
4	Position overshoot	The value of position deviation counter is over than the setting value.
5	Drive overheat	The temperature of the drive is high.
6	Speed amplifier saturation fault	Speed adjustment for long time saturation.
7	Drive inhibit error	Speed adjustment in saturation for long time.
8	Position deviation accumulation was out of range	Absolute value of position deviation accumulation is over than 2^{30}.
10	Power line disconnected	Power line is disconnected in the enabled state.
11	IPM module error	IPM smart module error.
13	Drive overload	Servo drive and motor overload(overheat instantaneously).
14	Brake fault	Brake circuit error.
18	Relay switch fault	The real state of relay is different from control state.
19	Delay to open the brake	Pulse inputs before opening.
20	EEPROM error	EEPROM error.
21	FPGA module fault	FPGA module fault.
22	The stored parameters and parameters stored in encoder mismatch	The value of PA62 was changed resulting in paramters mismatching.
23	Current collecting circuit fault	Current collecting circuit fault.
29	Alarm for torque overload	Motor load exceeds user-set values and range.
31	Encoder UVW signal error	Encoder UVW signal error or encoder mismatch
32	Encoder UVW signal illegal	UVW signal has all high levels, all low levels, or

	encoding	encoder mismatch
33	UVW signal failure	There is no high impedance state or encoder mismatch in the power-on timing sequence
34	UVW signal is unstable and jumps	UVW signal is poor.
36	Illegal status of the encoder is too long when the dart encoder is connected	Illegal status of encoder is too long when dart encoder is connected.
38	Failure to read or write encoder EEPROM communication	The encoder cable was not connected Or the encoder interface circuit fault.
39	Data CRC checking error	The motor encoder hasn't written dataes and all are 0.
40	Model not supported	Driver does not support this motor model.
41	Need to switch motor model	The current motor is inconsistent with the selected model of the drive.
42	AC input under voltage	AC input under voltage.
46	Main circuit under voltage	The power supply voltage of the main circuit is too low.
47	Over voltage when main circuit in powering up	Over voltage when main circuit in powering up.
50	Encoder communication fault	Driver and encoder are not connected.
51	Encoder communication abnormal	After the encoder established the communication, there appears the interrupt and disconnection.
52	Encoder battery voltage insufficient alarm	Encoder battery voltage insufficient alarm, but information did not lost and needs to be replaced as soon as possible.
53	Encoder battery voltage error alarm	Encoder battery voltage error alarm, and storage information has occurred error needing to reset encoder.
54	Encoder error alarm	Encoder non-battery alarm, but need to reset encoder again.
55	CRC check occurs errors for	Encoder communication received data CRC validation

	5 times in a row	5 consecutive errors.
56	MODBUS frame is too long.	MODBUS frame data received is too long.
57	Abnormal MODBUS communication format	Improper setting of communication parameters or incorrect address or value.
58	Single turn position error	Single turn position offset stored by the drive exceeds encoder resolution.
59	Encoder reporting CF error	Encoder continuously reports CF domain error and is needed reset encoder.

Chapter 9 Alarm Treatment Methods

No.	Name	Running state	Reason	Methods
1	Over speed	Through to control the power supply	1. Control circuit board failure. 2. Encoder failure.	1. Change servo drive. 2. Change servo motor.
		Appear during the motor operation	Input command pulse frequency is too high.	Set the input command pulse correctly.
			Acceleration/deceleration time constant is too small, making the speed overshoot too large.	Increase acceleration/deceleration time constant.
			The input electronic gear ratio is too large.	Correct setting
			Encoder failure.	Change servo motor.
			Encoder cable is defective.	Change encoder cable.
			The servo system is unstable, causing an overshoot.	1.Reset the relevant gain value. 2.If the gain cannot be set to the appropriate value, then reduce the load inertia ratio.
		Motor has just started	Too much load.	1.Reduce load. 2.Switch to more powerful drives and motors.
			1. Encoder zero-point error. 2.The UVW lead of the motor is connected incorrectly. 3.Encoder cable lead is incorrectly connected.	1.Change servo motor. 2.Please reset the encoder zero. 3.Correct wiring.
		Through to control the power	Circuit board is faulty.	Change drive.

2	Main circuit over voltage	supply		
		Appears when the main power supply is connected	1. Power supply voltage is too high. 2. Voltage waveform of the power supply is abnormal.	Check the power supply.
		Appear during the motor operation	Brake resistance connection disconnected.	Rewire the cable.
			1. Brake transistor is damaged. 2.Internal brake resistance is damaged.。	Change drive.
			Insufficient brake loop capacity.	1. Reduce the start and stop frequency. 2. Increase the acceleration and deceleration time constant. 3. Reduce the torque limit. 4. Reduce load inertia. 5. Replace the drive and motor with more power.
3	Main circuit under voltage	When the mains power is turned on	1. Circuit board is faulty. 2. Power supply insurance damage. 3. Soft start circuit is faulty. 4. Rectifier is damaged.	Change drive.
			1. Power supply is low. 2. Temporary power outage of more than 20ms.	Check the power supply.
		Appear during the motor operation	1. Power supply capacity is insufficient. 2. Power failure occurs immediately.	Check the power supply.
			Radiator is overheating.	Check the load.

4	Position overshoot	Through to control the power supply	Circuit board is faulty.	Change drive.
		Connect the main power supply and control line, input pulse command, the motor does not rotate or reverse	1. Zero change of encoder. 2. Encoder is faulty.	1. Adjust the zero of the encoder. 2.Change servo motor.
		Appear during the motor operation	Set a small detection range of position overshoot.	Increased the range of position out-of-range detection.
			Position proportional gain is too small.	Increase the gain value.
			Insufficient torque.	1.Check the torque limit value. 2.Reduce the load capacity. 3. Replace the drive and motor with more power.
			Command pulse frequency is too high.	Lower the frequency.
			Encoder zero change.	Re-adjust the encoder zero.
5	Drive overheat	The driver appears during operation	1. Circuit board is faulty. 2. Drive temperature is too high.	1.Lower the drive temperature. 2.Replace the servo drive.
6	Speed amplifier saturation	Appear during the motor	1.Load is large. 2.The motor is mechanically stuck.	1.Reduce the load. 2.Replace the drive and motor with more power.

	fault	operation		3.Check the mechanical part of the load.
7	Drive inhibit error		The input terminals of the CCW/CW driver cannot be disconnected.	Check cables.
8	Position deviation accumulation was out of range		1.Motor is mechanically stuck. 2.Input command pulse is abnormal.	1.Check mechanical part of the load. 2.Check command pulse. 3. Check whether the motor rotates according to the command pulse.
10	Power line disconnected	Motor is enabled or running	Loose power line, poor contact.	Check power lines.
11	IPM module error	Through to control the power supply	Circuit board is faulty.	Change drive.
		Appear during the motor operation	1.The power supply voltage is low. 2.Overheating.	1.Check drive. 2.Power it on again. 3.Replace drive.
			Short circuit between drive UVW.	Check cables.
			Poor grounding	Ground properly.
			Motor insulation is damaged.	Change motor.
			Interference.	1.Add line filters. 2.Keep away from interference sources.
13	Drive overload	Through to control the power supply	Circuit board is faulty.	Change drive.
		Appear during the	Operating in excess of rated torque.	1.Check the load. 2.Reduce start-stop

		motor operation		frequency. 3.Reduce the torque limit. 4.Replace more powerful drives and motors.
			Keep the brake closed.	Check the holding brake.
			Motor unstable oscillation.	1. Adjust the gain. 2. Increase acceleration/deceleration time. 3. Reduce load inertia.
			1. UVW has a phase disconnection. 2. Encoder is connected incorrectly.	Check the wiring.
14	Brake fault		Brake circuit error.	Change drive.
18	Relay switch fault		Relay fault	Return to factory for repair.
19	Delay to open the brake		The parameter value of PA94 is set too large, the control pulse is coming, and the lock has not been opened	Reduce the value of parameter PA94.
20	EEPROM error		The chip or circuit board is damaged.	1. Change servo drive. 2. After the repair, you must reset the drive model (PA10) to restore default parameters.
21	FPGA module fault		FPGA module fault.	Change drive.
22	The stored parameters and	The value of the PA62 parameter is	Switching encoder type requires resetting the system.	Set PA61 to 1 and then restart the power supply.

	parameters stored in encoder mismatch	modified, and the encoder type is changed.		
23	Current collecting circuit fault		Current collecting circuit fault	Change servo drive.
29	Alarm for torque overload		1. PA30 and PA31 parameters are incorrect. 2. Unexpected large load occurs.	1. Modify parameters. 2. Repair machinery.
30	encoder Z-pulse loss		1.Z pulse does not exist, encoder is bad. 2. Cable or shield is poor. 3. Shielding ground cable is not properly connected. 4. Encoder interface circuit is faulty.	1.Check the encoder. 2.Check the encoder interface circuit.
31	Encoder UVW signal error		1. Encoder UVW signal is damaged. 2. Encoder Z signal is damaged. 3. Cable or shield is poor. 4.Shielding ground cable is not properly connected. 5. Encoder interface circuit is faulty.	1.Check the encoder. 2.Check the encoder interface circuit.
32	Encoder UVW signal illegal encoding		1. Encoder UVW signal is damaged. 2. Cable is faulty. 3. Cable is poorly shielded. 4. Shielding ground cable is not properly connected.	1.Check the encoder. 2.Check the encoder interface circuit.

			5.Encoder interface circuit is faulty.	
33	Dart line encoder alarm		Parameter Settings do not match.	Set PA62 parameters correctly
34	UVW signal is unstable and jumps		UVW signal is poor.	Check the wiring.
38	Failure to read or write encoder EEPROM communication		1. The encoder cable was not connected. 2. The encoder interface circuit fault.	Check the wiring.
39	Data CRC checking error		The motor encoder hasn't written dataes and all are 0.	Write the motor parameters of the corresponding model to the encoder.
40	Model not supported		Driver does not support this motor model.。	Use matching motor.
41	Need to switch motor model		The current motor is inconsistent with the selected model of the drive.	Manually change the model to the current model.
42	AC input under voltage	When the power is down Runtime	1. Normal. 2. The input AC voltage is too low.	Check the AC220V input.
46	Main circuit under voltage	When the mains power is turned on	The power supply voltage of the main circuit is too low.	Checking the power supply and parameter PA122.
47	Over		1. External AC voltage input	1.Check the AC220V input.

	voltage when main circuit in powering up		is too high. 2.Main circuit is faulty.	2.Change the drive.
50	Encoder communication fault		Driver and encoder are not connected.	Connect the encoder cable and power it back on.
51	Encoder communication abnormal		After the encoder established the communication, there appears the interrupt and disconnection.	Connect the encoder cable and power it back on.
52	Encoder battery voltage insufficient alarm		Encoder battery voltage insufficient alarm, but information did not lost and needs to be replaced as soon as possible.	Replace the encoder battery.
53	Encoder battery voltage error alarm		Encoder battery voltage error alarm, and storage information has occurred error needing to reset encoder.	Encoder battery is exhausted and must be replaced.
54	Encoder error alarm		Encoder multiturn information count failure	Clear the fault and power it back on
55	CRC check occurs errors for 5 times in a row		Encoder communication received data CRC validation 5 consecutive errors.	Check the hardware lines related to encoder communication.
56	MODBUS frame is too long.		1.Communication protocol mismatch. 2.Interference.	1.Check the frame length. 2.Increase line filter, away from the interference.
57	Abnormal		1.Improper setting of	Replace driver

	MODBUS communication format		communication parameters. 2.Improper setting of communication incorrect address or value.	
58	Single turn position error		Single turn position offset stored by the drive exceeds encoder resolution.	Power on and start up again.
59	Encoder reporting CF error		Encoder continuously reports CF domain error and is needed reset encoder.	Needed reset encoder.