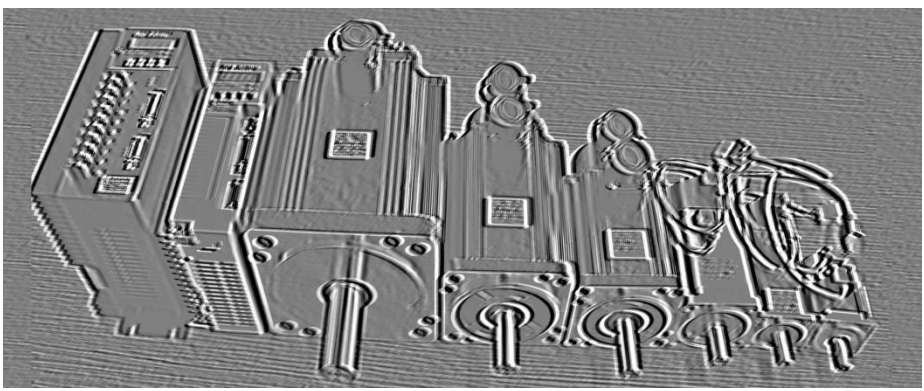
SBF Series

AC servo driver

Article of Design and Debug



CE
ISO9001

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Required Reading

I. Personnel Safety

- The product is high-voltage and large-current, which can ensure that the personnel are in safe area of the facility when the current is switched on.
- The product is high-voltage and large-current, mistaken operation may cause electric arc burn, electric shock and other accidents.
- It is prohibited that the wring and power are operated not in accordance with instruction.

II. Occasion Security

- The product is high-voltage and large-current, and it mustn't be powered under the place with combustible gas and corrosive gas. Otherwise, it will cause fire and explosion.
- The product is prohibited to be powered in the inflammable and explosive dripping places. Otherwise, it will cause fire and explosion.
- The product is prohibited to be powered in the occasion with humidity, water vapor, metal powder, etc. Otherwise, it will cause electric shock and other dangerous accidents to the operator and other people.

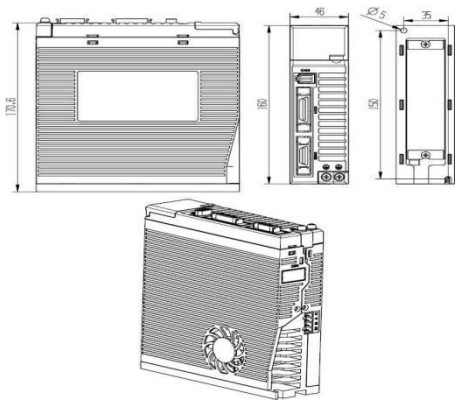
III. Product and Equipment Safety

- The product is high-voltage and large-current, and its wrong wiring will bring damage to the product.
- The PE terminal must be connected to earth wire, and ensure that the earth wire is reliable grounding.
- The L series of the product is applied to AC220V power supply, while the H series is applied to AC380V power supply. They mustn't be mistaken.
- The U, V, and W product should be connected to the motor, for the output, and mustn't be connected to the input power.
- The U, V and W product are all three-phase output, and the wrong wiring order will cause motor galloping problem, bring damage to the equipment, and the over-current cause damage to product.
- Please tighten all terminals, and all wirings must strictly follow specifications and are selected in accordance with watts.
- Power distribution or terminals touching are prohibited when the driver is powered on.
- It is prohibited to touch the terminal within 5 minutes when the power is cut off.
- It is prohibited to touch motor and cable when the motor is operated in case of burning, wrenching and other accidents.

Note

Chapter 1 Installation

1.1 The Installation Size of the AC Servo Driver (unit: MM)



- Figure 1.1 Appearance size figure of 10A, 22A and 32A.

1.2The Installation Size of the AC Servo Driver (unit: MM)

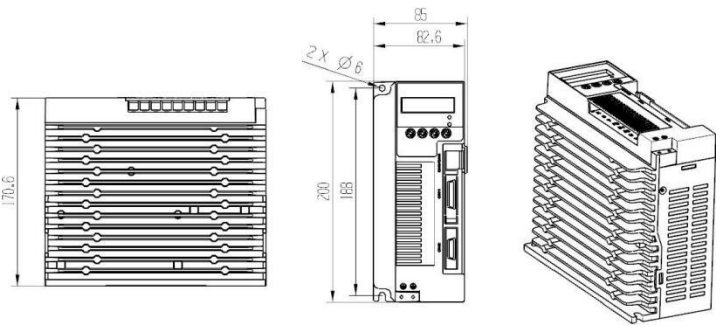


Figure 1.2Appearance size figure of 20 A and 30 A.

1.3 The Installation Size of the AC Servo Driver (unit: MM)

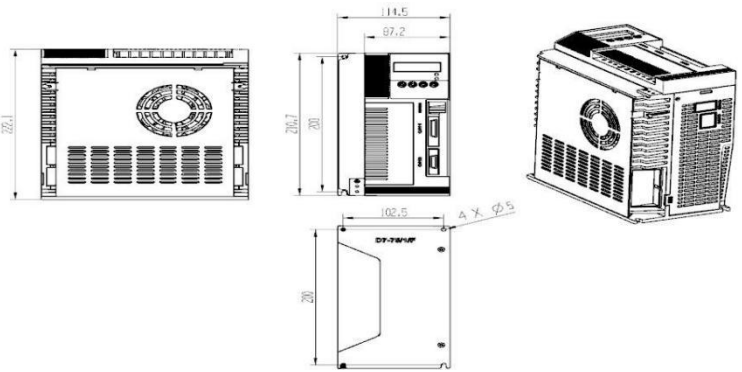


Figure 1.3 Appearance size figure of 25A, 50A and 75A.

1.4 The Installation Size of the AC Servo Driver (unit: MM)

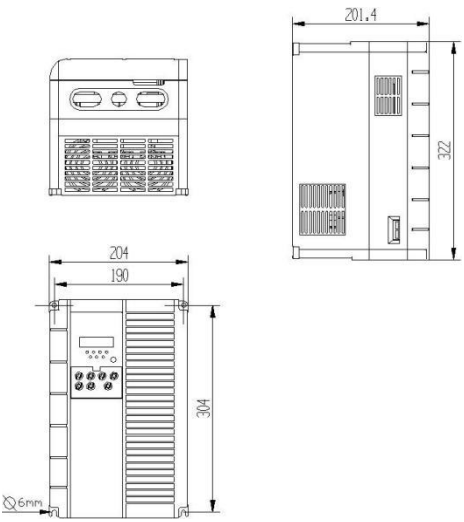


Figure 1.4 Installation size figure of 100A.

1.5 The Installation Size of the AC Servo Driver (unit: MM)

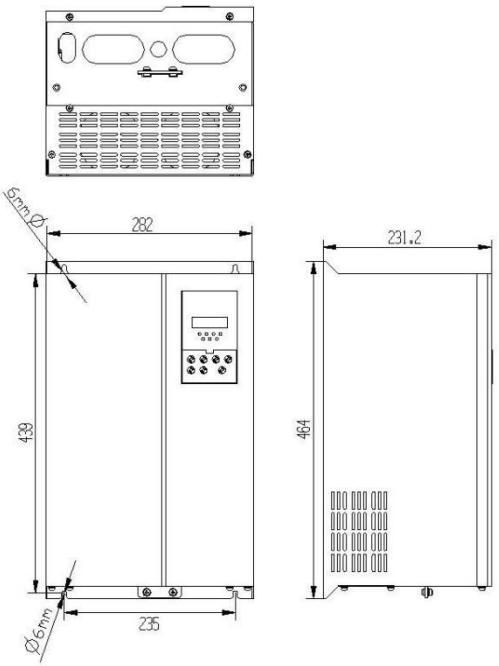


Figure 1.5 Installation size figure of 150A.

1.6The Installation Place

I. In order to maintain the driver operate normally, we should make sure that its surrounding temperature is below 50℃ and its relative humidity is under 90%, and the safe operating temperature in the long term is below 40℃.

II. The AC servo driver is easily to break down under the place with corrosive gases, moisture, metal dust, water, processing liquid and other severe environment. Therefore, we should give full consideration of the working environment of the driver when installation.

III. The equipment connected with the AC servo driver, whether directly or indirectly, its vibration need to be guaranteed below the 0.5G (4.9m/S2) or even smaller, in order to ensure long-term stable operation of the AC servo drive.

IV. When the AC servo driver interferes other equipment, it may also be interfered at the same time. So when installing the electric cabinet or complete equipment, we must pay attention to the wiring installation of the strong and weak current, for the strong external interference signal will influence the power line and control signal of the servo driver, which may also cause the improper operation of the driver in serious condition, and may even cause mis-operation. The host computer and other control equipment, at the same time, will work unstably under the interference of instability and poor wiring. We should pay attention to install sound magnetic ring, wave filter, isolation transformer, etc. in the interference source and interfered places. Particular attention to control signal line of the driver, which is easy to be disturbed, it should have a reasonable route line and shielding measures.

1.4 The Installation Direction and Space

I. Pay attention to the installation direction (see figure 1.3).

II. Pay attention to the installation distance (see figure 1.3).

III. The 4 M5 screws can be fixed, but they need to install the elastic pad.

IV. A servo must be installed in a relatively closed space, and make sure that the electric cabinet is ventilized, which installed with a filter to prevent dust from entering, and the filter must be regularly cleaned to prevent the air clogging.

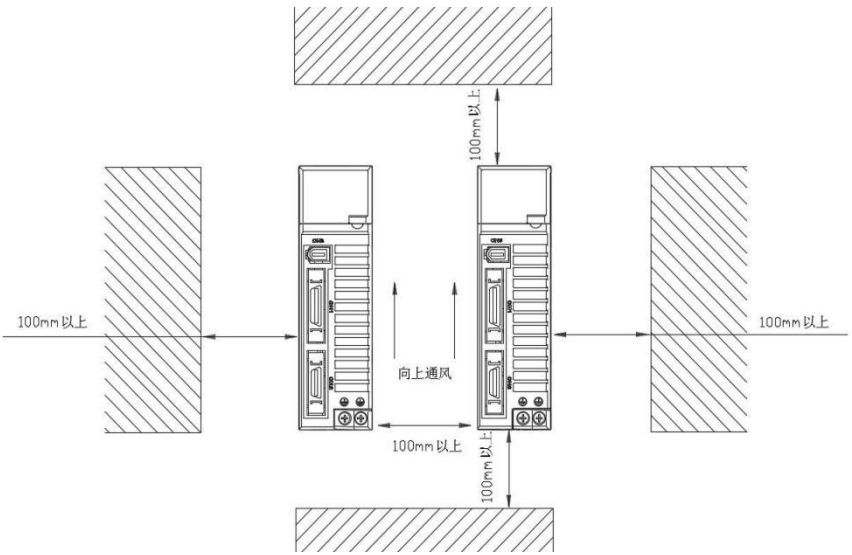


Figure 1.6 Installation Orientation Figure

Chapter 2 The Overview of the Functions

2.1 The Basic Functions of the DO series of the AC Servo Driver

Chart 2.1 Function List

Model		the DO series（10A~150A）
Control power supply and main circuit power supply		L: single-phase or three-phase power supply, AC220V； H: three-phase power supply, 380 V Voltage Fluctuation: -15~+10%, 50/60Hz
Environment	Temperature	Working: 0~55° C　　Storage: -40° C ~80° C
	Humidity	No more than 90%(Non Condensing)
	Air Index	There is no dust (iron powder and other conductive media) in electric cabinet.
Control Model		1: Location control 2: Speed control 3: Torque control 4: JOG operation 5: Internal speed Speed per hour 6:Internal location control 7: Internal torque control 8: Location & Speed control 9: Speed &Torque control
External I/O		1: Servo driver 2: Resetting 3: Clear position deviation 4: impulse, CCW, CW, prohibition 5: Position switching 6: Selection of speed 7: Zero speed clamp 8: Clear zero second 9: Orientation, quasi stop and other extended functions (optional)10: position completion
Encoder Feedback		10000p/r(standard), Frequency division (optional)
Communication Device		1: RS232(optional)　　2: RS485(optional)
Load Inertia		5 times less than motor Inertia
Monitor Function		Rotational speed, current position, instruction pulse accumulation, position deviation, motor current, operating state, input and output terminals, Z pulse signal, etc.
Protection Function		Over voltage, over-current, over-speed, overload, abnormal feedback and so on.
Alarming Function		When the servo is operating abnormally, there will appear alarming output, LED flashing and red light.
Gain Adjustment		We can gain adjustment so as to match the motor performance when the motor is operating or stops operation.

Note

Chapter 3 Wiring

3.1 Attentions

- The servo driver is high-voltage and large-current, and its wrong wiring will bring damage to personnel and equipment.
- The PE terminal must be connected to earth wire, and ensure that the earth wire is reliable grounding.
- The L series of the product is applied to AC220V power supply, while the H series is applied to AC380V power supply. They mustn't be mistaken.
- The U, V and W product should be connected to the motor, for the output, and mustn't be connected to the input power.
- The U, V and W product are all three-phase output, and the wrong wiring order will cause motor galloping problem, bring damage to the equipment, and the over-current cause damage to product.
- Please tighten all terminals, and all wirings must strictly follow specifications and are selected in accordance with watts.
- Power distribution or terminals touching are prohibited when the driver is powered on.
- It is prohibited to touch the terminal within 5 minutes when the power is cut off.
- It is prohibited to touch motor and cable when the motor is operated in case of burning, wrenching and other accidents.

3.2 Requirements of the Wiring

- It is best to use three-phase isolation transformer as power supply.
- The wire diameter requirement of R, S ,T and U, V, W and PE is no less than 1.5 ㎡.
- The power terminals are all required as cold-pressed terminal, and ensure that they are firm and reliable.
- CN1, CN2 are high density signal plugs with a shielding layer of cable.
- The wiring requirements of PE terminal is that the wire diameter of the yellow and green is no less than 2.5 ㎡

3.3 Wiring Methods

- It is best to use three-phase isolation transformer as power supply.
- The wire diameter requirement of R, S ,T and U, V, W and PE is no less than 1.5 ㎡.
- The power terminals are all required as cold-pressed terminal, and ensure that they are firm and reliable.
- CN1and CN2 are high density signal plugs with a shielding layer of cable.
- The wiring of the PE terminal should connected with the shell of its connected equipment and with the earth.

3.4 Typical Wiring

3.4.1 Position control (pulse type)

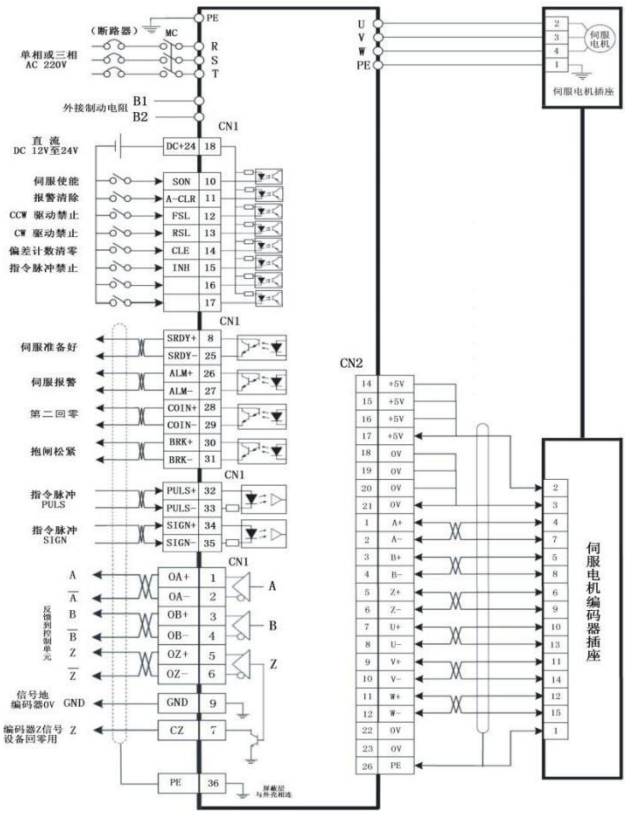


Figure 3.1 Position Control Wiring

3.4.2 Speed Control (Analog)

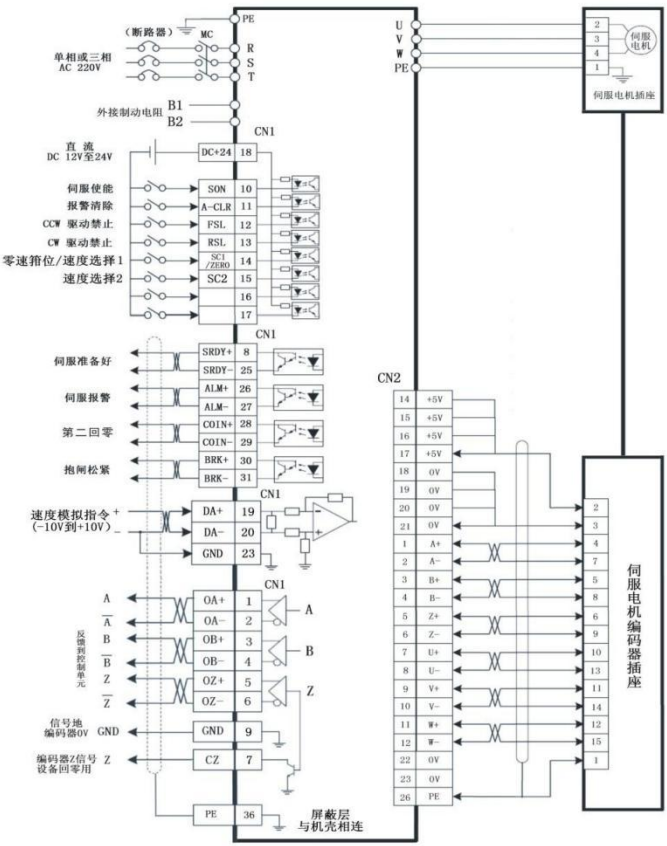
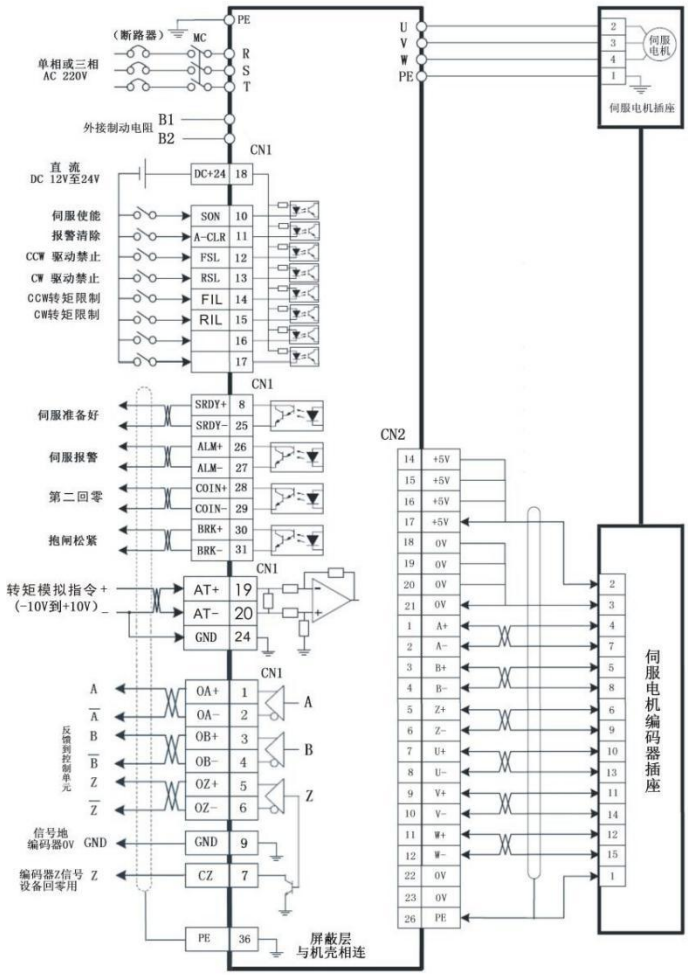


Figure 3.2 Speed Control Wiring

3.4.3 Torque Control (Analog)



● Figure 3.3 Torque Control Wiring

3.4.4 The Wiring Diagram of Provincial Line Type of Motor Encoder

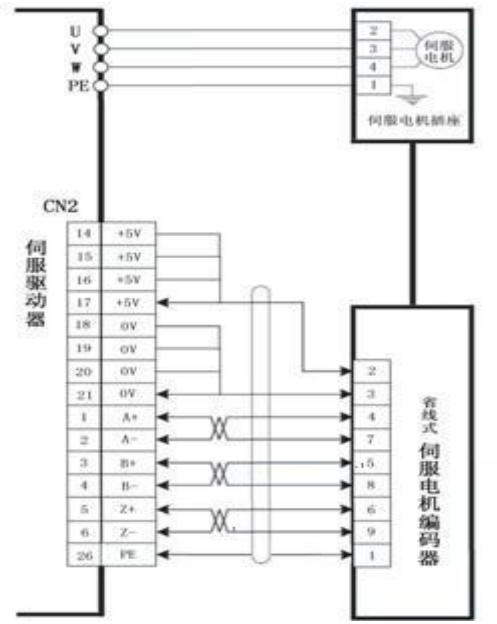


Figure 3.4 The wiring diagram of Provincial Line Type of Encoder

- If it is the 80 series of servo motor, then select the provincial line type of encoder.
- If it is the 110 series of servo motor, then select the ordinary incremental encoder (see figure 3.2 Wiring). Restore the automatic identification of the motor when the motor leaves the motor, and there is no need to change the parameters (see Page 64).

3.4.5 The Brake Wiring Diagram of Servo Motor

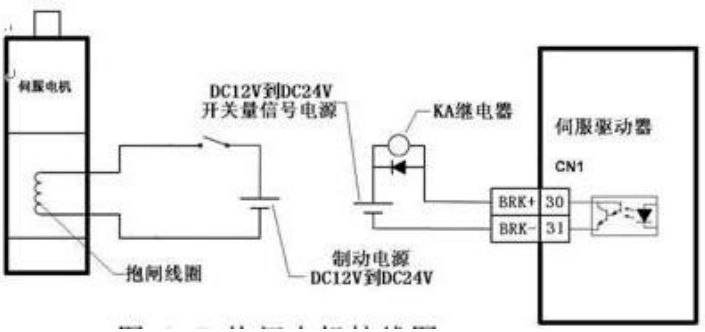


Figure 3.5 The wiring diagram of brake motor

Pin No.	Pin identification	Functional Specification
1	DC+	Positive electrode of DC power supplyDC24V+
2	DC-	Negative electrode of DC power supply 0V
3	PE	Outer shell

Table 3.1 The Brake Socket of the Servo Motor

- The DC power supply of the braking power, upper motor and driver are separated, so as to prevent interference.
- The brake power supply has positive and negative electrode, and should not be connected reversely in order to prevent circuit.
- In order to improve the braking effect and its response, the two ends of the braking coil can be added with a continuous current diode (pay attention to the positive and negative electrode).

Chapter 4 Interface

4.1 The Definition of the Servo Control Power Supply and Electric Terminal

Identification	Signal Name	Functions
R	Control circuit, main circuit power supply (connected by isolated transformer)	L:R 、 S 、 T can connect there-phase or single-phase power supply with any two terminal of 220V 50HZ, the control power supply of the machine and the main circuit power supply are designed integrally. H: R, S, and T can connect there-phase power supply with 380V 50HZ, the control power supply of the machine and the main circuit power supply are designed integrally. Note: They cannot be connected with motor U, V and W.
S		
T		
PE	The earth wire of the input power supply	It is strictly connected with the earth wire of the equipment enclosure and the total power supply of the workshop.
B1/P+	External braking resistor	Mini-watts parts are usually not used external braking resistor, and the driver has a built-in resistance. There are specifications about the model of external braking resistor applied to the case of large inertia and high-speed operation.
B2/PB		
U	Output to servo motor	The U, V and W in the servo terminal must apply to that in the servo motor, they cannot be mismatched. Otherwise, the wrong wiring will cause life accidents and equipment failure, and bring damage to the servo system. Note: They cannot be connected with motor U, V and W.
V		
W		
PE	Output motor ground wire	Connected with the shell of servo motor and PE.

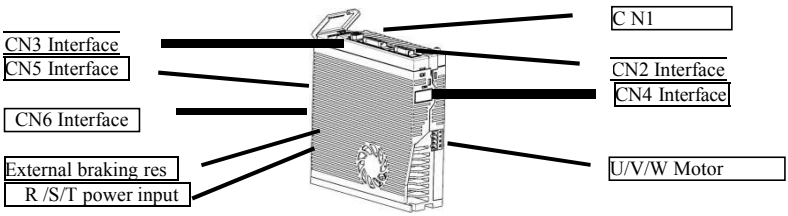


Figure 4.1 The connection distribution graph of 10A～22A

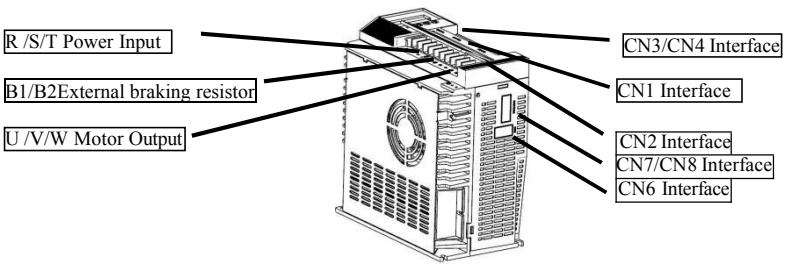


Figure 4.2 The connection distribution graph of 30A～75A

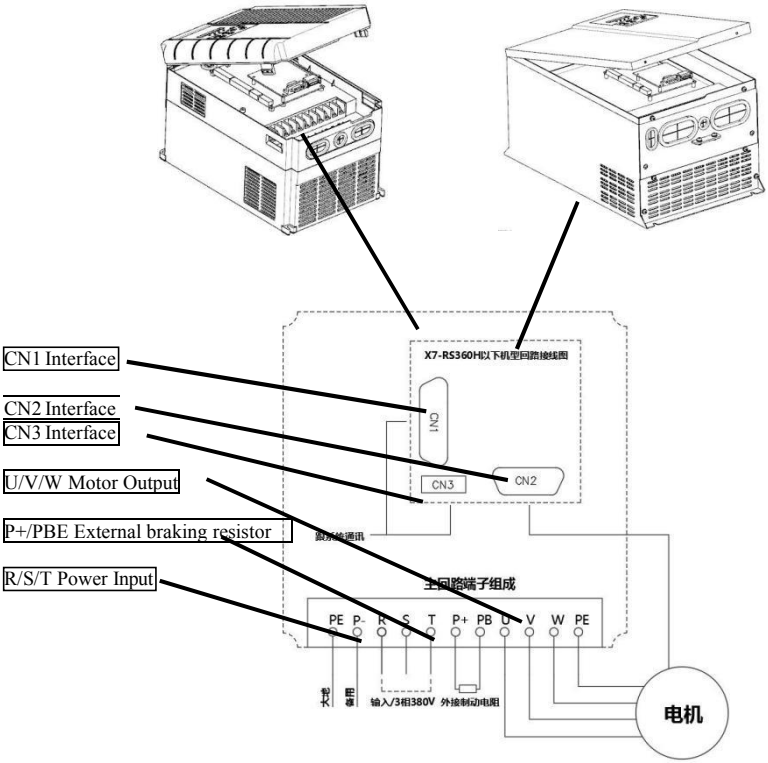


Figure 4.3The connection distribution graph of 100H～150H

4.2 CN1 Interface, the Definition of Controlling the Signal Input and Output

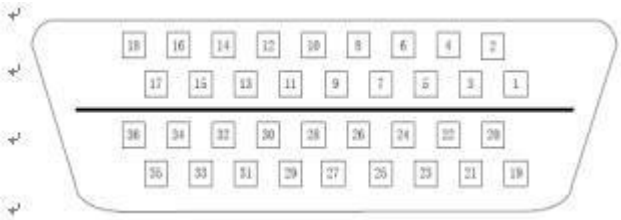


Figure 4.4 to see against interface CN1 36Core plug weld

Pin	Identification	Signal Name	Functions
18	＋24V	The positive input source	The public end of the input terminal (connected to + 12V + 24V power supply)
10	SON	Servo enabler	Enabler terminal: Cut off 0V is OFF: The driver stops, and the motor is in free. Switch on 0V is ON: the drive is in operation, and the motor is in lock. When the enabler is 40MS, it can receive the order. The signal can’t be used to switch on and off as the operation or stopping of the motor.
11	A－CLR	Alarming Clearance Model Switching	the terminal of alarming clearance and model switching: Cut off 0V is OFF: normal or alarming Switch on 0V is ON: alarming clearance When the PA32=1,we can change model.
12	FSL	The banning cases of CCW Driver	It is prohibited to rotate the terminal of the servo motor in counter-clockwise direction: When the parameter PA20=0: Cut off 0V is OFF: the servo motor can rotate in counter-clockwise direction. Switch on 0V is ON: the servo motor cannot rotate in counter-clockwise direction. Equivalent to the function of limit switch, PA55 can be set as normally open normally closed. Match with the parameter PA20, when the parameter PA20=1, it will mask the function.

Pin	Identification	Signal Name	Functions
13	FSR	The banning cases of CW Driver	It is prohibited to rotate the terminal of the servo motor in clockwise direction: When the parameter PA20=0: Cut off 0V is OFF: the servo motor can rotate in clockwise direction. Switch on 0V is ON: the servo motor cannot rotate in clockwise direction. Equivalent to the function of limit switch, PA55 can be set as normally open normally closed. Match with the parameter PA20, when the parameter PA20=1, it will mask the function.
14	CLE	Deviation counter clearance	Deviation counter clearance terminal 1 Under location control model, that is PA4=0 Cut off 0V is OFF: keep the value of the deviation counter. Switch on 0V is ON: clear the location deviation counter.
	SC1	Internal speed selector terminal 1	Internal speed selector terminal 1: When parameter PA4=1, PA22=0, it is interna l speed model Select the four kinds of the internal speed through the combination of SC1 (14 feet) and SC2 (15 feet) and the on-and-off of the 0V: SC1 OFF, SC2 OFF: the internal speed is 1； SC1 ON, SC2 OFF: the internal speed is 2； SC1 OFF, SC2 ON: the internal speed is 3； SC1 ON, SC2 ON: the internal speed is 4; The four kinds of speeds can adjust through PA24, PA25, PA26, and PA27.
	ZERO	Zero speed clamp	The clearance terminal of the speed order analog: When the parameter PA4=1, PA22=1, it is external analog speed mode: Cut off 0V is OFF: the speed order is the analog value. Switch on 0V is ON: the speed order is set as zero.
	CCW	0～+10 Forward	External analog controls PA22=2, 0～+10V controls forward.
	RIL	CCW Torque Limitation	When there is torque limitation, it is prohibited to rotate the terminal of the servo motor in clockwise direction: Switch on 0V, the value of the parameter PA38 is effective, otherwise it is invalid. When there is torque limitation, the parameter PA34 is always used as limitation.

Pin	Identification	Signal Name	Functions
15	INH	Command pulse banning	The banning terminal of the command pulse: When the parameter PA4=0, the controlling model of the external location is as follows: Cut off 0V is OFF: it is effective for the command pulse. Switch on 0V is ON: it is prohibited for the command pulse
	SC2	Internal speed selector terminal 2	Internal speed selector terminal 2 When parameter PA4=1, PA22=0, it is internal speed model Select the four kinds of the internal speed through the combination of SC1 (14 feet) and SC2 (15 feet) and the on-and-off of the 0V(set by PA24~PA27): SC1 OFF，SC2 OFF: the internal speed is 1； SC1 ON，SC2 OFF: the internal speed is 2； SC1 OFF，SC2 ON: the internal speed is 3； SC1 ON，SC2 ON: the internal speed is4；
	FIL	CCW Torque Limitation	When there is torque limitation, it is prohibited to rotate the terminal of the servo motor in counter-clockwise direction: Switch on 0V, the value of the parameter PA38 is effective, otherwise it is invalid. When there is torque limitation, the parameter PA34 is always used as limitation.
	CW	0～+10 reversal	External analog controls PA22=2, 0～+10V controls reversal.
8	SRDY＋	The servo output	For example: the 8 feet is connected with ＋24V, the 25 feet is connected with the upper machine. When the servo is in normal operation, the upper machine can receive ＋24V level. When the servo is alarming, ＋24V cut off with the upper machine.
25	SRDY－		For example: the 25 feet is connected with 0V, the 25 feet is connected with the upper machine. When the servo is in a normal operation, and the upper machine can receive 0V level. When the servo is alarming, 0V cut off with the upper machine (normally closed). The level reversion and normally open normally closed can be adjusted by the parameter PA57

Pin	Identification	Signal Name	Functions
26	ALM＋	The servo alarming output	For example: the 26 feet is connected with ＋24V, the 27 feet is connected with the upper machine. When the servo is alarming, the upper machine can receive ＋24V level. When the servo is in normal operation, ＋24V cut off with the upper machine. For example: the 27 feet is connected with 0V, the 26 feet is connected with the upper machine. When the servo is in a normal operation, and the upper machine can receive 0V level. When the servo is alarming, 0V cut off with the upper machine (normally closed). The level reversion and normally open normally closed can be adjusted by the parameter PA57
27	ALM－		
28	COIN＋	The second clearance(applied for Siemens) Complete the location Or the speed arrives	For example: the 28 feet is connected with ＋24V, the 29 feet is connected with the upper machine. When the location is completed or the speed reaches or another clearance is carried out, the upper machine can receive ＋24V level. Otherwise, ＋24V cut off with the upper machine. For example: the 29 feet is connected with 0V, the 28 feetis connected with the upper machine. When the location is completed or the speed reaches or another clearance is carried out, the upper machine can receive 0Vlevel. Otherwise, 0V will be cut off with the upper machine (normally closed). The level reversion and normally open normally closed can be adjusted by the parameter PA57 It is more applied to the CNC returning to zero of machine tools Siemens 801 and 802.
29	COIN－		
30	BRK＋	Mechanical brake tightness(brake)	Brake switch output terminal: For example: the 30 feet is connected with ＋24V, the 31 feet is connected with the positive end of relay coil. When the motor is enabled, the middle relay coil can receive ＋24V level, otherwise, ＋24V will be cut off with the middle relay coil. For example: the 31 feet is connected with 0V, the 30 feet is connected with the negative end of relay coil. When the motor is enabled, the middle relay coil can receive 0V level, otherwise, 0V will be cut off with the middle relay coil. The level reversion and normally open normally closed can be adjusted by the parameter PA57 The PA47 is set as brake delay for switching on. The PA48 is set as brake delay for switching off.
31	BRK－		

Pin	Identification	Signal Name	Functions
32	PULS＋	Command pulse Input	External input terminal of the command pulse: PA36、PA37 are set as pulse filter coefficient and anti-interference。 When location control, set the pulse input model through PA14 PA14=0, Pulse＋Direction（seen as default. PA14=1, CCW/CW pulse mode. PA14=2, two-phase command pulse mode.
33	PULS－		
34	SIGN＋	Command pulse SIGN Input	
35	SIGN－		
19	DA＋	The command input of analog speed	The external command input terminal of analog speed The analog command input range of speed control: －10V～＋10V When in single-way torque control, it is defaulted as the torque input.
20	DA－		
23	GND	Analog input	Analog input
21	AT＋	The command input of simulated torque	The external command input terminal of simulated torque The analog command input range of speed control: －10V～＋10V
22	AT－		
24	GND	Analog input	Analog input
1	OA	Encoder A phase	The encoder ABZ has signal difference, outputted by the driver and reflected to the upper machine.
2	OA		
3	OB	Encoder B phase	
4	OB		
5	OZ	Encoder Z phase	
6	OZ		
7	CZ	Open collector and output of Encoder Z phase	Set the clearance point, one circle of the motor only sent a Z-phase signal. Encoder Z-phase signal is outputted by open collector, when there is a output, it is ON(connecting), otherwise it is OFF(cutoff)
9	GND	Encoder 0V	Encoder 0V（public earth wire, can also share a earth wire with 36feet)
36	PE	Grounding cables of shielding layer	Connected with the shell, improve the anti-interference by short-circuit with digital ground according to the different kinds of upper machines, and ensure that they are reliably connected to the ground.

4.3 CN2 Interface, the Definition of the Encoder Input Signal

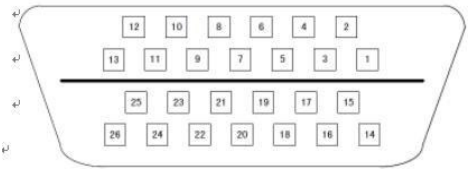
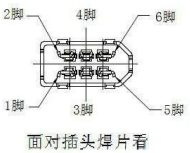


Figure 4.5 to see against interface CN1 26 Core plug weld

Pin No.	Identification	Signal Name	Functions
14,15,16,17	＋5V	Encoder＋5V power supply	Power for the encoder(use shielding cables)
18,19,20,21, 22,23	0V	Encoder 0V earth wire	
1	A＋	Encoder A＋input	Connect with the servo motor A＋
2	A－	Encoder A－input	Connect with the servo motor A－
3	B＋	Encoder B＋input	Connect with the servo motor B＋
4	B－	Encoder B－input	Connect with the servo motor B－
5	Z＋	Encoder Z＋input	Connect with the servo motor Z＋
6	Z－	Encoder Z－input	Connect with the servo motor Z－
7	U＋	Encoder U＋input	Connect with the servo motor U＋
8	U－	Encoder U－input	Connect with the servo motor U－
9	V＋	Encoder V＋input	Connect with the servo motor V＋
10	V－	Encoder V－input	Connect with the servo motor V－
11	W＋	Encoder W＋input	Connect with the servo motor W＋
12	W－	Encoder W－input	Connect with the servo motor W－
26	PE	Grounding cables of shielding layer	Connect with the shell, improve the anti-interference by short-circuit with digital ground according to the different kinds of upper machines, and ensure that they are reliably connected to the ground.

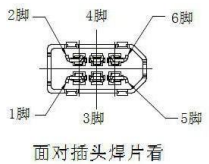
4.3.1 The Definition of CN3 Interface

1: As 485 communication (modulus standard agreement)



Pin No.	1，2	3	4	5	6
Identification	GND	485+	485-	Blank	Blank

2: The definition of the second feedback interface (422 signal difference)



Pin No.	1	3	4	5	6
Identification	GND	A+	A-	B+	B-

4.4 The Principle of Digital Input Interface

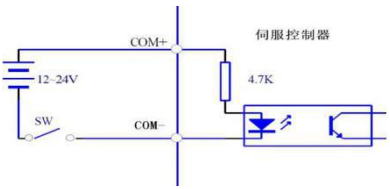


Figure 4.6 The Digital Input Interface

- It needs to connect the external DC12V－24V power supply, current is no less than 105MA.
- The reverse positive and negative wiring will bring damage to the driver, even the out of order in the machine.

4.5 The Principle of Digital Output Interface

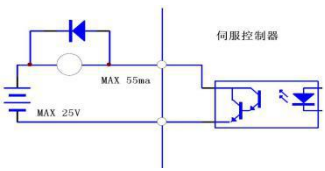


Figure 4.7 The Digital Output Interface

- The max voltage is 25V, the max current is no more than 55 MA.
- The reverse positive and negative wiring will bring damage to the driver, even the out of order in the machine.
- The output load is inductive component, which needs to be reversed and continued (It must be connected with the right negative, otherwise it will damage the driver, which is equivalent to short-circuit).

4.6 The Principle of Pulse Input Interface

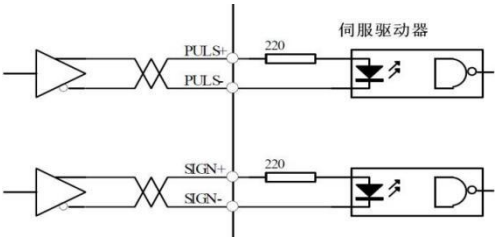


Figure 4.4-a The Output Mode of Pulse Difference

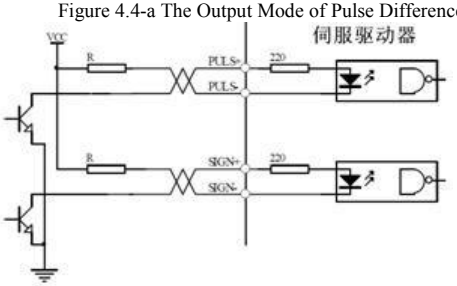


Figure 4.8 The Output Mode of Pulse Single-end

- The output mode of pulse difference should be relatively reliable, and it is recommended to adopt the AM26LS31 and other drivers that are similar with RS422.
- Single-end input mode of the power is external, the operating frequency will decrease. We have the following data.

Input Voltage Vcc	Serial Resistance R
24V	1.4K~2K
12V	500 ou ~820 ou
5V	80ou~120 ou

4.6.1 The Pulse Input Mode

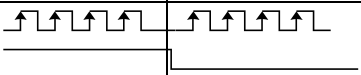
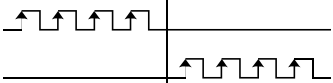
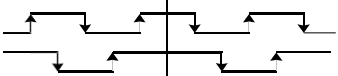
Pulse Mode	CCW operation	CW operation	Parameter selection
Pulse positive direction			Parameter PA14=0
CCW Pulse CWPulse			Parameter PA14=1
ABDual phase quadrature pulse			Parameter PA14=2

Figure 4.9 Pulse Mode

4.7 The Principle of Analog Input Interface

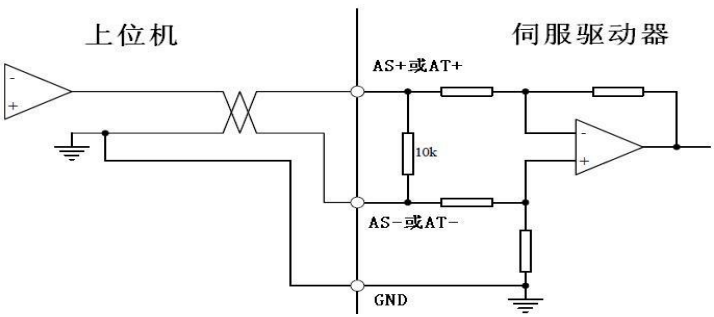


Figure 4.10The input interface of the analog difference

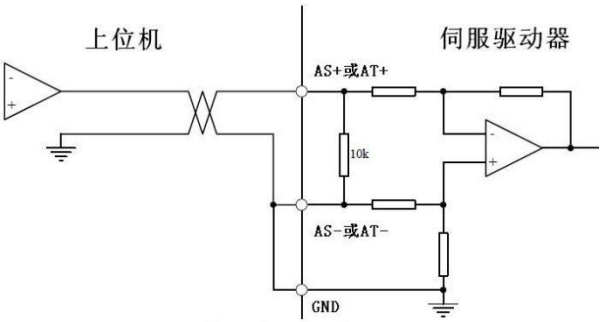


Figure 4.11The input interface of the analog single-end

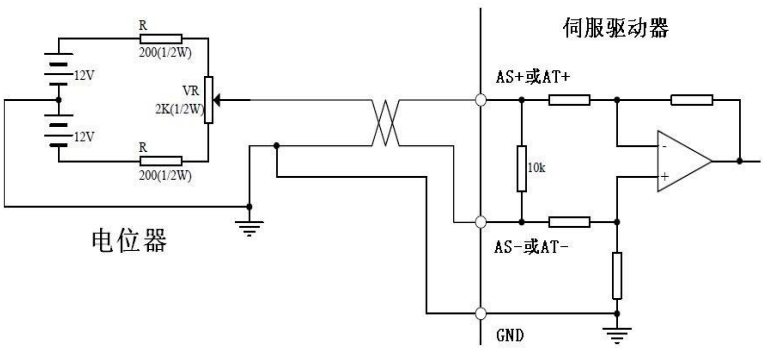


Figure 4.12The input interface of analog differential potentiometer

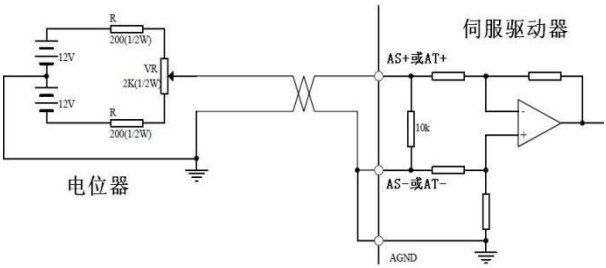


Figure 4.13The input interface of analog single-end potentiometer

- The analog input voltage should not exceed 10V~10V, otherwise it will damage the driver.
- There is deviation in the analog quantity, because of the attenuation and interference of the wire and the interface circuit. It is recommended to use the cable of shielding layer for connection, the two ends are connected to the ground, the parameter PA49 can set the threshold voltage (unit: circle / per minute).
- There is a deviation in the analog quantity, and it must be adjusted, and the parameter PA45 can compensate the deviation value.

4.8 The Principle of the Encoder Interface

4.8.1 The Signal Output of Encoder CN1 Interface (from driver to upper machine)

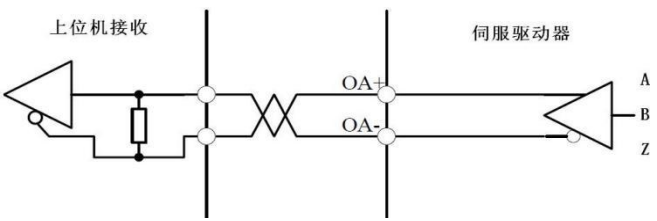


Figure 4.14The output interface of CN1 encoder

The signal of encoder is output by differential driver AM26LS31, without isolation.

The host computer can adopt AM26LS32 or high-speed photoelectric coupling to receive signal.

4.8.2 The Signal Output of Encoder CN1 Interface(from servo machine to driver)

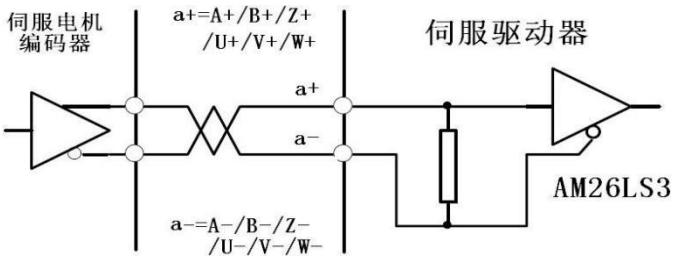
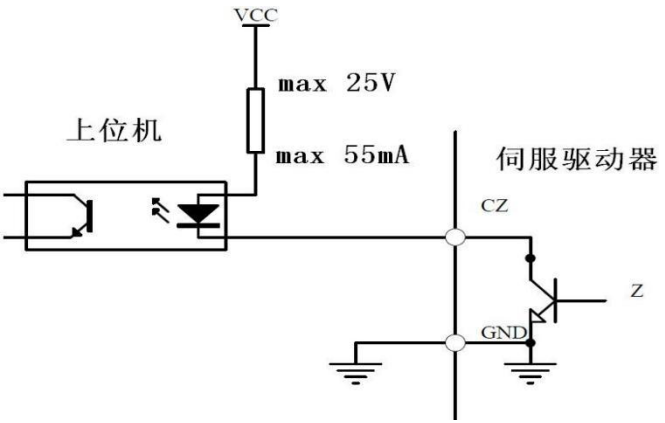


Figure 4.15CN2 photoelectric encoder input interface

4.8.3 The Z Signal Output of Encoder CN1 Interface (from driver to upper machine for clearance)



- This Z signal is output by the open collector without isolation, and the encoder Z signal has no cut-off.
- It is necessary to use high speed photoelectric coupler for receiving the signal.

Note

Chapter 5 Display and Operation

5.1 Panel Board Operation

There are six LED digital tube display and four button " ↑ , ↓ , ←,Enter" and a red light "Alm", a green light "Run", which are set to display a variety of system status, set parameters, etc.

Figure 5.1 Operation Panel

The operation is stratified, as follows:

←key indicates the back, exit, cancel of the level;

Enter key indicates the progress, entry, and determination of the level;

↑,↓key indicates the increase or decrease in the No. or value;

Alm: when the red indicator light is on, indicating the alarm and the digital tube will display an alarming;

Run: when the green indicator light is on, which indicates that the motor is in a state of being able to work;

- When the decimal point on the lower right corner of the digital tube is on, which indicates that the current parameter value is in the modified state.
- If there is Alarm red light on and the alarming No. "Err--xx" flashing, it is a driving alarm, which need to be cut off immediately and find out the cause of the alarming.

5.2 Parameter Structure Composition

First to select the mode of operation, there are 7 modes, press ← key to return to the main menu, press ↑, ↓ key to select mode, press Enter key to enter the selected second layer, press ← key to return to first layer.

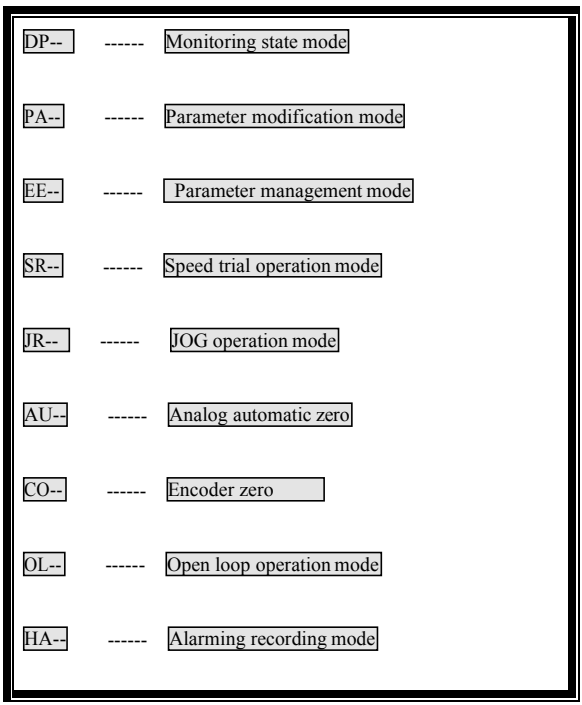


Table 5.1 Mode operation diagram

5.2.1 Parameter Monitoring Mode（DP- -）

DP-SPD -- motor speed	→ r 1000 -- 1000 rpm
DP-POS -- 5 bit lower than current location	→P80829 -- 80829 pulse DP-
POS -- 5 bit higher than current location	→ P 11 -- 110000 pulse
DP-CPO -- 5 bit lower in the location command	→C81410 -- 81410 pulse
DP-CPO -- 5 bit higher in the location command	→ C 22 -- 220000 pulse
DP-EPO -- 5 bit lower in the location deviation	→ E 9 -- 9 pulse
DP-EPO -- 5 bit higher in the location deviation	→ E 0 -- 0 pulse
DP-TRQ -- Motor torque(%)	→ T 60 -- Motor torque70%
DP-- 1 -- Motor current(A)	→1.2.15 --Motor current2.15A
DP-LSP -- Z pulse acoounting	→80829 -- Z pulse No.
DP-CNT -- Current control mode	→CNT 0 -- control mode0 DP-
FRQ -- Position command frequency	→r 1000 -- 1000 rpm
DP- CS -- Speed command	→r. 35 --Speed command35rpm
DP- Ct -- Torque command	→t 70 -- Torque command 20%
DP-APO -- Absolute rotor position	→A 3325 -- 3325pulse
DP--IN -- Input terminal status	→Inhllhl-- Input terminal status
DP-Out -- Output terminal status	→outllhl-- Output terminal status
DP-COD -- Encoder UVW input	→cod lh -- Encoder signal
DP-SFB -- Second feedback low 5 bit	→P83820 -- 83820pulse
DP-SFB -- Second feedback high 5 bit	→ P 20 -- 200000pulse
DP-MOC -- Motor temperature	→ t. 50 -- 50℃
DP-DEG -- IPM Module temperature	→ **t. 40 -- 40℃**

Table 5.2 Monitor list

- Input pulse is the pulse accumulated by the input of the electronic gear.
- Pulse unit is the servo pulse unit, 10000 pulse / ring.
- Running status display:

“Digital tube display” indicates the electric servo is off.

“Red light” indicates that the servo is in trouble.

The “green light” indicates that strong and enabler of the servo is connected, and in the running state.

- The absolute position of the rotor in a circle indicates the position of the rotor relative to the stator in a circle.

With a ring as a circle, the range is 9999 ~ 0, and the electronic gear ratio does not participate in the accumulating.

- DO-1000 series covers the 4 power part appearance of the servo driver, the interface definition can be exchanged, some power connection parts or parameters related with power will be slightly different.

5. Input terminal status display, as shown below:

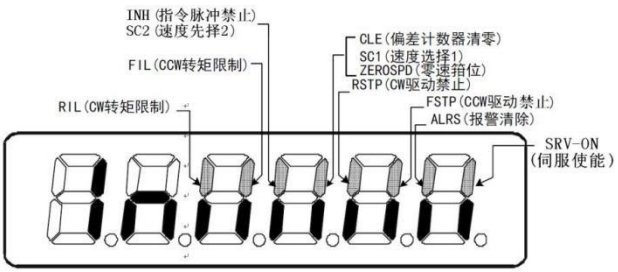


Figure 5.2 Input terminal status display
(A light stroke, which indicates input signal, is ON, out which indicates disconnect, is OFF)

6. Input terminal status display, as shown below:

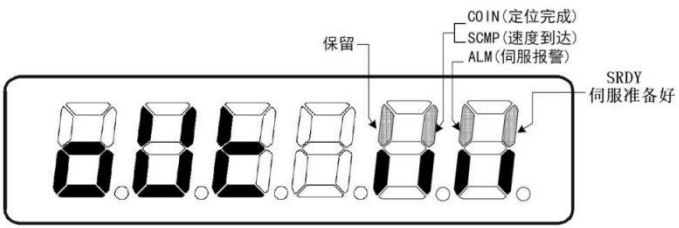


Figure 5.3 Input terminal status display
(A light stroke, which indicates input signal, is ON, out which indicates disconnect, is OFF)

7. Encoder status display, as shown below:

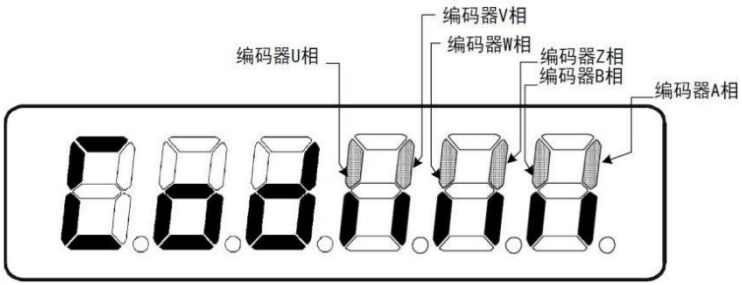


Figure 5.4 Encoder feedback signal state display
(A light stroke, which indicates input signal, is ON, out which indicates disconnect, is OFF)

5.2.2 Parameter Adjustment Mode (PA- -)

Press "Enter" key to "PA" parameter adjustment mode, press ↑, ↓ key to make increasing or decreasing for the parameter No., Press "Enter" key to modify the parameter. When the parameter changes, the decimal point in the lower right corner of digital tube will be on, then press "Enter" key to make sure the decimal point is off, then press ← key to return.

Table 5.3 Parameter adjustment mode operation

PA--0	Parameter password	→	385	User password
PA--1	Motor model code	→	51	On behalf of the 15015 models of the motor
PA--4	Control mode selection	→	0	Position control mode

5.2.3 Parameter Management Mode (EE- -)

Press "Enter" key to "**EE--"** parameter management mode, pres s , key to make increasing or decreasing the parameter No.. Find the menu for storage or restore, press " Enter for " key lasting for 3 seconds, it will appear the success of operation "Finish". It will take effect after power off, there will appear "Error" if it failed or the password is wrong.

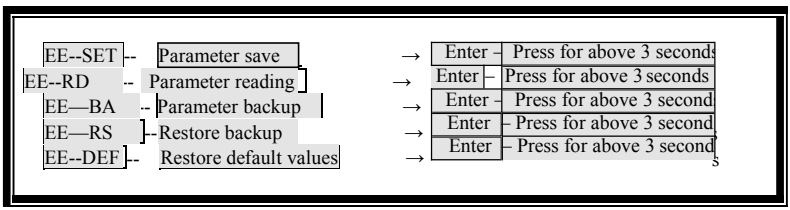


Table 5.4 Parameter management mode operation

1. **EE—SET Parameter save.** Parameter PA-0 password is 315, mainly for the permanent preservation of the parameters, when the save is completed, the film will not be broken off. Once the power is on, we can use the modified parameters.

2. **EE—BD Parameter backup.** It is used to write the parameters, which are better under current servo status, to the EEPROM backup area, and is combined with the restoring backup.

3. **EE—RS Restore backup.** Restore the parameters in the backup area from the EEPROM to the parameter table.

4. **EE—DEF Restore Defaults.** When debug the new motor, or there is confusion in the parameter or other unclear reasons, try to restore the defaults.

To restore the default value, the motor model must be matched, the PA--0 must be set to 385, PA--1 is set to the corresponding motor model code, and then restore the default value.

5.2.4 JOG Dynamic Operation Mode (Jr- -)

Press "Enter" key to "Jr--" dynamic operation mode, press it again to enter "J--" dynamic operating mode, the speed of dynamic is set by parameter PA21, press ↑, ↓ key to proceed commutation of the motor.

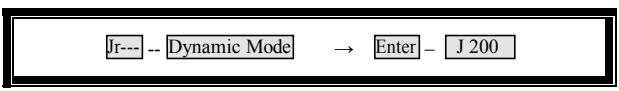


Table 5.5 JOG dynamic operation mode

5.2.5 Speed Trial Operation Mode（Sr- -）

Press "Enter "to "Sr--" speed operation mode, then press it again to enter "S--" dynamic operation mode, speed command and direction of motor, press ↑, ↓ key to change the No. value and its negative and positive value.

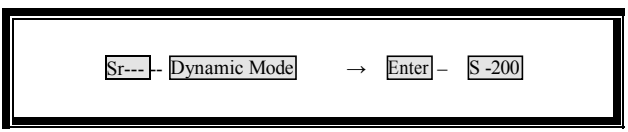


Table 5.6 Speed trial operation mode

5.2.6 Analog Automatic Zero Setting Mode（AU- -）

Ⅰ.Speed Analog Returning to Zero

Press "Enter" to "AU--spd" analog returning to zero mode, than press "Enter" key for above 3 seconds to "Start" speed analog returning to zero status, when finished, it will display "Finish" and automatically save the zero drift value to PA45(or pa 39). After that you can manually modify the zero drift value in the PA45 (or PA39), and then manually save.

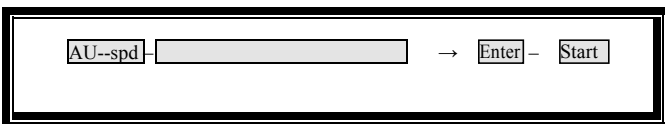


Table 5.7a The speed analog returning to zero mode

- The parameter PA49 can be set as the threshold voltage (unit: turn / per minute)

II.Torque Analog Returning to Zero

Press "Enter" to "AU--trq" analog returning to zero mode, than press "Enter" key for above 3 seconds to "Start" speed analog returning to zero status, when finished, it will display "Finish" and automatically save the zero drift value to PA45(or pa 39). After that you can manually modify the zero drift value in the PA45 (or PA39), and then manually save.

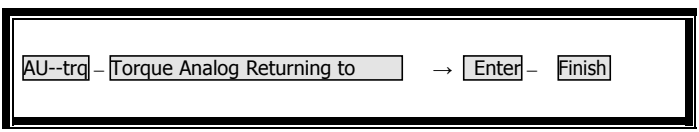


Table 5.7b Torque Analog Returning to Zero Operation

5.2.7 Encoder Automatic Zero Setting Mode（CO- -）

I. Encoder Automatic Zero Setting

Press "Enter" to "CO--" encoder automatic zero setting mode, then press "Enter" for above 3 seconds, the encoder automatic zero setting mode will start, when finished, it will display "Finish".

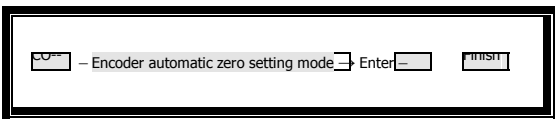


Table 5.8 Encoder automatic zero setting mode

- Mainly used in revision between Z pulse and motor magnetic pole punching angle after the servo motor is installed.

5.2.8 Open Loop Operation Mode (OL- -)

I. Open Loop Operation

Press "Enter" to open loop operation mode, the press it again for over 3 seconds to start open loop operation mode, the motor will rotate, when finished, it will display "Finish".

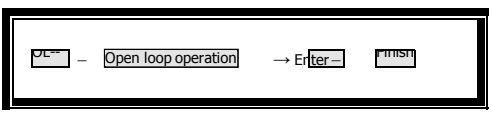


Table 5.9 Open loop operation mode

- Use to determine whether the servo motor has such obvious quality problems as bearing and rotor assembly.

Chapter 6 Parameter

6.1 List of Parameters [PA Mode;]

Parameter No.	Parameter name	Unit	Parameter range	Default
0	Parameter password	*	0~9999	315
1	Motor model	*	0~52	50
2	Software version No.	*	*	98
3	Initial state display	*	0~21	0
4	Control method selection	*	0~7	0
5	Speed proportional gain	Hz	50~500	150
6	Speed and the time constant	mS	1~1000	20
7	Torque filter	%	20~500	100
8	Velocity detection filter	%	20~500	100
9	Position proportional gain	1/S	1~500	40
10	Position feed forward gain	%	0~100	0
11	The cutoff frequency of the position feed forward filter cutoff frequency	Hz	1~1200	300
12	Position command pulse frequency divider	*	1~32767	1
13	Position command pulse frequency denominator	*	1~32767	1
14	The input mode of the position command pulse	*	0~2	0
15	The reverse direction of position command pulse	*	0~1	0
16	Positioning complete range	Pulse	0~30000	20
17	The detection range of position error	×100 Pulse	0~30000	400
18	Position error is not valid	*	0~2	0
19	The smoothing filter of position order	0.1mS	0~30000	0
20	Drive inhibited input is not valid	*	0~2	1
21	JOG operation speed	r/min	-3000~3000	120
22	command selection of the internal and external speed	*	0~2	1
23	Maximum speed limit	r/min	0~4000	3600
24	Internal speed 1	r/min	-3000~3000	0
25	Internal speed 2 (the current of motor returning to zero)	r/min	-3000~3000	100
26	Internal speed 3	r/min	-3000~3000	300
27	Internal speed 4	r/min	-3000~3000	-100
28	Arrival rate	r/min	0~3000	500
29	Analog torque command input gain	0.1V/100%	10~100	50

Parameter No.	Parameter name	Unit	Parameter range	Default
30	The alarming value of the user torque overload	%	50~300	200
31	The alarming detection time of the user torque overload	mS	10~30000	0
32	Permission of the control mode switching	*	0~1	0
33	The reverse input direction of the analog torque	*	0~1	0
34	Internal CCW torque limit	%	0~300	300*
35	Internal CW torque limit	%	-300~0	-300*
36	The filter coefficient of command pulse signal	*	0~3	1
37	The filter coefficient of command direction signal	*	0~3	0
38	External CCW, CW torque limit	%	0~300	100
39	Zero drift compensation of analog torque command	*	-2000 ~2000	0
40	Acceleration time constant	mS	1~10000	100
41	Deceleration time constant	mS	1~10000	100
42	Nonfunctional terminal switching	Binary	0000~1111	0001
43	Analog speed command gain	(r/min) / V	10~3000	300
44	The reverse direction of the analog speed	*	0~1	0
45	Zero drift compensation of analog speed command	*	-5000 ~5000	0
46	The filter of analog speed/torque command	Hz	0~1000	300
47	when the motor is enabled, set the conduction of the brake delaying	×10mS	0~200	80
48	when the motor is enabled, set the misconduct of the brake delaying	×10mS	0~200	0
49	The speed control of the analog voltage threshold value	r/min	0~3000	0
50	Speed limit for torque control	r/min	0~5000	3600*
51	Effective dynamic electronic gear	*	0~1	0
52	The command pulse frequency divider in second position	*	1~32767	1
53	The forced ON input of low 4 bit input terminal	Binary	0000~1111	0000
54	The forced ON input of high 4 bit input terminal	Binary	0000~1111	0000
55	The reverse setting of low 4 bit input terminal	Binary	0000~1111	0000
56	The reverse setting of high 4 bit input terminal	Binary	0000~1111	0000
57	The reverse control of output terminal	Binary	0000~1111	0000
58	The time setting of the presentation mode 2	0.1S	1~30000	600
59	Demo mode selection	*	0 ~ 2	0

Parameter No.	Parameter name	Unit	Parameter range	Default
60	Current loop proportional gain	*	*	*
61	The time constant of the current loop integral	*	*	*
62	Reserve (not allowed changes)	*	*	*
63	The zero offset value of motor encoder	Pulse	-32768~32768	160
64	Motor pole pairs	*	*	4
65	The line No. of the incremental encoder	Pulse	0~131072	2500
66	The type selection of motor	*	0~2	0
67	The rated current of motor	0.1A	0~130	100
68	The coefficient of speed proportional gain	*	0~500	*
69	Maximum speed limit of the presentation mode 2	r/min	0~6000	3000
70	The output setting of driver feedback pulse	Pulse	0~30000	10000
71	The output direction selection of feedback pulse	*	0~1	1
72	The divider of the feedback pulse output electronic gear	*	1~32767	1
73	The denominator of the feedback pulse output electronic gear	*	1~32767	1
74	The double-frequency coefficient switching of the servo receiving pulse	*	0~1	0
75	The low-order of the second feedback pulse	Pulse	*	0
76	The high-order of the second feedback pulse	Pulse	*	1
77	The reverse direction of the second feedback pulse	*	0~1	0
78	The error alarm threshold of synchronous position	*	0~30000	500
79	The second feedback selection	*	0~4	1
80	Address setting of 485 communication axis	*	0~5000	1
81	Specific rate selection of 485 communication wave	*	0~3	2

Parameter No.	Parameter name	Unit	Parameter range	Default
82	485 communication odd-even parity selection	*	0~1	0
83	The filter coefficient of the encoder ABZ	*	*	*
84	Filtering time of DP-I display value	*	*	50
85	Allow the No.3 to alarm	*	0 ~ 1	0
86	The time coefficient of torque to reach	*	*	*
87	The range coefficient of torque to reach	*	*	*
88	Parameter save	*	0 ~ 1	0
89	Reserve (not allowed changes)	*	*	*
90	The low 16-bit storage of encoder single loop value	Decimal system	0~65536	0
91	The low 16-bit storage of encoder single loop value	Decimal system	0 ~ 1	0
92	The low 16-bit storage of encoder multiple loop value	Decimal system	0~65536	0
93	Reserve (not allowed changes)	*	*	*
94	Reserve (not allowed changes)	*	*	*
95	Speed control	r/min	0~5000	*
96	Current control	0.1A	0~130	*
97	Alarming code monitoring	*	1~32767	*
98	The time constant scaling factor of current integral	*	0~1000	100
99	Reserve (not allowed changes)	*	*	*

Parameter No.	Parameter name	Unit	Parameter range	Default
100	The temperature display of IPM module	*	*	*
101	The fan control of the driver	*	*	*
102	The starting temperature of the driver fan	*	*	*
103	The alarming threshold of IPM module temperature	*	*	*
104	Bus voltage filter	*	*	*
105	Energy consumption action voltage	*	*	*
106	Bus braking voltage difference	*	*	*
107	Voltage value of under voltage detection	*	*	*
108	The alarming of whether to shield the ERR14	*	*	*
109	The phase detection of whether to shield three-phase power	*	*	*
110	Reserve (not allowed changes)	*	*	*
111	Reserve (not allowed changes)	*	*	*
112	Reserve (not allowed changes)	*	*	*
113	Reserve (not allowed changes)）	*	*	*
114	Reserve (not allowed changes)	*	*	*
115	Reserve (not allowed changes)	*	*	*
116	Reserve (not allowed changes)	*	*	*
117	Reserve (not allowed changes)	*	*	*

6.2 Detailed Parameters

Parameter No.	Parameter name	Detailed function	Parameter range [default]
0	Parameter password	a. User's password is 315. b. Model code password is 385，which is only used to modify parameter PA1. c. Motor manufacturer password is 510，which will come into power while on line (not recommended).	0~9999 [315]
1	Model code	a. It is used for different types of servo motor. Set basing on table 2.2 and then restore the factory value. After the servo motor restores the factory value automatically, the power needs to be turned off to make it come into effect. b. Modify this parameter. PA0 parameters need to be 385.	0~9999[38]
2	Software version	a. Only show the software version number. Read only. b. When the version number is odd, it is in full function; while even, it is a pulse type. c. The analog quantity control function adds to the whole function type comparing to the pulse type.	80~9999[98]
3	Initial state display	The initial display state of the digital tube on the driver. 0: Show the motor speed; 1: Show that the current position is lower than 5 bit; 2: Show that the current position is higher than 5 bit; 3: Show that the position command (instruction pulse accumulation) is lower than 5 bit； 4: Show that the position command (instruction pulse accumulation) is higher than 5 bit; 5: Show that the position deviation is lower than 5 bit; 6: Show that position deviation is higher than 5 bit; 7: Show the motor torque 8: Show the motor current; 9: Show the Z pulse count; 10: Show the control mode; 11: Show the position command pulse frequency; 12: Show the speed command; 13: Show the torque command; 14: Show the absolute position of rotor in rotor; 15: Show the input terminal status; 16: Show the output terminal status; 17: Show the encoder input signal; 18: Show the running state; 19: Show the alarm code;	0~19[0]

Parameter No.	Parameter name	Detailed function	Parameter range [default]
4	Control mode selection	0: Position control mode; 1: Speed control mode; a. The internal and external speeds are selected by the parameter PA22; b. The internal speed is selected by the CN1 interface; 14 foot SC1 and 15 foot SC2 combination choice of 4 kinds of internal speed: SC1 OFF, SC2 OFF: internal speed 1; Speed setting PA24 SC1 ON, SC2 OFF: internal speed 2; Speed setting PA25 SC1 OFF, SC2 ON: internal speed 3; Speed setting PA26 SC1 ON, SC2 ON: internal speed 4; Speed setting PA27 2: Trial operation control mode; 3: JOG control mode; The speed is set by the parameter PA21. 4: Encoder zero setting mode; For the motor factory to adjust the coding disc zero. 5: Open loop operation mode; Used for detecting motor and encoder 6: Torque control mode (input -10V~+10V); 7: Torque control mode (output 0V~+10V/14,15 Feet choose the pros and cons);	0~7 [0]
5	Speed proportional gain	a. Enhance the speed proportional gain of the rigid set speed loop regulator; b. The larger the setting value, the higher the gain, the greater the stiffness. The parameter value is determined according to the specific servo drive system model and load condition. Under normal circumstances, the greater the load inertia, the greater the set value； c. Under the condition that the system does not generate oscillation, as far as possible, set a larger value;	50~500 [150]
6	Velocity integral time constant	a. Integral time constant of setting speed loop regulator; b. Motor overshoot can be inhibited. The smaller the set value, the faster the integration; while it is easy to too generate the overshoot if too small. On the contrary it will slow down the respond; c. According to the specific drive model and load inertia setting, the greater the load inertia, the greater the set value will be;	1~1000 [20]

Parameter No.	Parameter name	Detailed function	Parameter range [default]
7	Torque filter	a. Noise setting torque command filter characteristics; b. It is used to suppress the resonance produced by the torque; c. The bigger the value, the greater the cut-off frequency, the smaller the vibration and noise generated by the motor. If the load inertia is too large, the set value can be increased properly. If the No. is too large, it will result in slow response, and it may cause oscillation. d. The smaller the value, the smaller the cutoff frequency, the faster the response. If a higher torque response is required, the set value can be reduced.	20~500 [100]
8	Velocity detection filter	a. Noise setting velocity detection filter characteristics. b. The larger the value, the greater the cut-off frequency, the smaller the noise generated by the motor. If the load inertia is too large, the set value can be increased properly. If the value is too large, it will cause the slow response and may cause oscillation. The smaller the value, the higher the cutoff frequency, the faster the speed feedback. If a higher speed response is needed, the set value can be reduced.	20~500 [100]
9	Position proportional gain	a. Proportional gain of a set of position loop regulator. b. The larger the setting value, the higher the gain, the greater the stiffness, the smaller the position lag under the same frequency command pulse condition. But if the value is too large, it may cause oscillations or overshoot. c. The parameter value is determined according to the specific servo drive system model and load condition.	1~500 [40]
10	Position feed forward gain	a. Set the feed forward gain of a positioning ring. b. When set to 100%, it is indicated that the position delay is always 0 at the command pulse of any frequency. c. The feed forward gain of the position loop is increased, and the high speed response of the control system is improved, but the position loop of the system is unstable, and easy to generate oscillation. d. The feed forward gain of the position loop is usually 0 unless it requires a very high response characteristic.	0~100 [0]

Parameter No.	Parameter name	Detailed function	Parameter range [default]
11	Position feed forward filter cutoff frequency	a. Cutoff frequency of low pass filter for setting position loop feed forward. b. The role of this filter is to increase the stability of the composite position control.	1~1200 [300]
12	Position command pulse frequency divider	a. If the system is programmed to walk 5 mm (5000 pulses) to the motor to turn a circle: $\frac{PA\ 12}{PA\ 13} = \frac{\text{Pulse molecule}}{\text{Pulse}} = \frac{\text{Actual feedback}}{\text{Command pulse}}$ $= \frac{\text{motor encoder lines (2500 lines) X frequency doubling (4)}}{\text{Instruction pulse No. (5000)}}$ $= \frac{10000}{5000} = \frac{2}{1}$ b. If the motor is directly connected with the screw rod, and the screw thread pitch is 6 mm: $\frac{PA12}{PA13} = \frac{10}{\text{Screw pitch (6)}} = \frac{5}{3}$ Note: CNC machine tool can refer to B to set more intuitive version. Gear ratio range: $1/100 \le G \le 100$	1~32767 [1]
13	Position command pulse frequency division denominator		1~32767 [1]
14	Position command pulse input mode	3 kinds of pulse input modes can be set: 0: Pulse + symbol; 1: CCW pulse/CW pulse; 2: Two phase orthogonal pulse input; See 35 page figure 4.4-c pulse form	0~2 [0]
14	Position command pulse input mode	3 kinds of pulse input modes can be set: 0: Pulse + symbol; 1: CCW pulse/CW pulse; 2: Two phase orthogonal pulse input; See 35 page figure 4.4-c pulse form	0~2 [0]

Parameter No.	Parameter name	Detailed function	Parameter range [default]
15	Position command pulse direction	0: Default direction. 1: Direction inversion.	0~1 [0]
16	Positioning complete range	a. While position control, the position deviation counter value is less than or equal to the set value, the positioning of the completion of ON COIN, otherwise OFF. b. In other control mode, it is the signal for reaching speed .	0~3000 [20]
17	Position error detection range	In the position control mode, when the position deviation counter is bigger than the value of the parameter setting, the servo driver will alarm.	0~3000 [400]
18	Position error. Detection or not.	0: Effective detection; 1: Screen 4 alarm, PA17 is not valid. 2: Screen No.4 and No. 6 alarms. PA17 is invalid.	0~2 [0]
19	Position instruction smoothing filter	Mainly for the PC without slowing down. When it does not have the exponential form of acceleration and deceleration, this parameter can be a smooth filter for the instruction pulse, and to optimize the acceleration and deceleration. This filter will not lose the pulse, and the execution speed may be delayed.	0~3000 [0]
20	Drive inhibit input is not valid	0: CCW, CW Disable input. 1: CCW, CW Invalid input inhibit. 2: CCW, CW Input is not valid. No alarm prompt.	0~2 [1]
21	JOG running speed	Set the JOG mode to a positive and reverse speed setting.	-3000~3000 [120]
22	Internal and external speed selection	0: From internal speed. 1: Taken from external analog (-10V ~ +10V). 2: Taken from the external analog (0 ~ 14,15; +10V feet choose positive and negative)	0~2 [1]
23	Maximum speed limit	Setting the maximum speed limit of the servo motor related to the servo motor. Set the highest speed of the motor according to the parameters of the PA1 adaptation model.	0~5000 [3600]
24	Internal speed 1	When PA4=1,PA22=0: CNISC1 foot OFF, SC2 foot OFF for the internal speed of 1	-3000~3000 [0]

Parameter No.	Parameter name	Detailed function	Parameter range [default]
25	Internal speed 2/ Zero current	a. When PA4=1,PA22=0: When CNISC1 foot ON, SC2 foot OFF, the internal speed is 2 b. When PA4=4，set the motor to adjust the zero current percentage;	-3000~3000 [100]
26	Internal speed 3	When PA4=1,PA22=0: When CNISC1foot OFF，SC2foot ON, the internal speed is 3	-3000~3000 [300]
27	Internal speed 4	When PA4=1,PA22=0: When CNISC1foot ON, SC2 foot ON, the internal speed is 4	-3000~3000 [-100]
28	Arrival rate	Non location mode: When the motor speed is greater than the set value, COIN: ON, otherwise OFF. This parameter only judges the speed of the motor.	0~3000 [500]
29	Analog torque command input gain	a. Set the proportional relationship between the torque input voltage and the actual operating torque of the motor; b. The unit of the set value is 0.1V/100%; c. The default value is 50, corresponding to the 5V/100%. That is, the input 5V voltage generated 100% of the rated torque.	10~100 [50]
30	User torque overload alarm value	①Sets the user torque overload value, which is the percentage of the rated torque. The torque limit value has no direction. Both the forward and the reverse are all protected; ②In the case of PA31>0, the motor torque >PA30, duration of >PA31, the driver will alarm. The alarm No. is Err-29 and the motor stops. The driver must reset the alarm after the alarm gives.	0~300 [200]
31	Torque overload detection time	Torque overload detection time and the unit is millisecond; When it is 0, the user torque overload alarm function is invalid;	0~30000 [0]

Parameter No.	Parameter name	Detailed function	Parameter range [default]
32	Control mode switching allowed	0:CN1's 11 foot (A-CLR) is only effectively used for alarm clearance. 1: When the parameter PA4=0, the CN1, 11 pin (A-CLR) is only used for position and speed switching. (the default location is valid) When the parameter PA4=1, the CN1, 11 pin (A-CLR) is only effectively used for speed and torque switching. (the default speed is valid) When the parameter PA4=6, the CN1, 11 pin (A-CLR) is only effectively used for torque and position switch. (the default torque is valid)	0~1 [0]
33	Torque command negative direction	The polarity of the input of the analog torque is reversed. 0: When the torque command is positive, the torque direction is CCW; 1: When the analog speed command is positive, the torque direction is CW ;	0~1 [0]
34	Internal CCW torque limit	Set the internal torque limiting ratio of the motor CCW direction. For example: When set to 2 times the rated torque, the set value is 200. This set value has been limited to valid.	0~300 [250]
35	Internal CW torque limit	Set the internal torque limiting ratio of the motor CW direction. For example: When set to 2 times the rated torque, the set value is -200. This set value has been limited to valid.	0~-300 [-250]
36	Command pulse signal filter	PA4=0, effective position control The stronger the setting value, the stronger the interference of the command pulse and the smaller the pulse frequency will be, which is unlikely to receive the pulse. Timing advance or lag of pulse and direction signal can be adjusted.	0~3 [1]
37	Signal filtering factor	PA4=0, effective position control. Timing advance or lag of pulse and direction signal can be adjusted.	0~3 [0]

Parameter No.	Parameter name	Detailed function	Parameter range [default]
38	External torque limit	When PA4=6, CN1 14 or 15 feet connect with 0V: CCW, CW torque percentage limit, whose positive and negative sides at the same time are effective. PA38 is less than PA35, PA34 set value.	0~300 [100]
39	Zero drift compensation for analog torque	The zero drift compensation amount of the analog torque input is the positive and negative offset.	-2000~2000 [0]
40	Acceleration time constant	Set value is indicated by the acceleration time of the motor from the 0~1000r/min. Linear acceleration and deceleration characteristics are only used for speed control. If the PC has acceleration and deceleration characteristics, this parameter should be set to 0.	1~10000 [100]
41	Deceleration time constant	Set value is the reduction time of the motor from the 1000~0r/min. Linear acceleration and deceleration characteristics are only for speed control. If the PC has acceleration and deceleration characteristics, this parameter should be set to 0.	1~10000 [100]
42	Multifunctional terminal switch	0:15 alarm is effective /1: Screen 15 alarm; [0001] 0: Select back to zero again /1: Select location is completed; [0010] 0: Turn the PA50 parameter speed to the maximum while modulation in torque /1: While torque turn the second analog modulation to the maximum speed;[0100]	0000~1111 [0001]
43	Analog speed instruction input gain	Set the ratio between the input voltage of the analog input voltage and the actual running speed of the motor. For example: positive and negative 10V voltage corresponding to the positive and negative 3000, which can be set as 3000/10 =300 r/min/v, that is, 1V corresponds to 300 rpm.	10~3000 [300]

Parameter No.	Parameter name	Detailed function	Parameter range [default]
44	Analog speed command direction	On the polarity of the input of analog quantity 0: When the analog speed command is positive, the speed direction is CCW; 1: When the analog speed command is positive, the speed direction is CW;	0~1 [0]
45	Zero drift compensation for analog speed command	Zero drift compensation for analog input speed is the positive and negative offset. The parameter value will be automatically changed and saved when the analog quantity is automatically transferred. See table 5.7a, page 41.	-5000~5000 [0]
46	Analog speed command filter	Low pass filter for analog input speed. The bigger the setting, the faster the speed of the input analog response, the greater the noise will be; the smaller the setting, the slower the response speed, the smaller the noise will be;	0~1000 [300]
47	When the brake motor enable conduction delay setting	The maximum value of 500 for the delay is 5 seconds, and the default is 0.8 second. It refers to the normal driving electric motor, to enable BRK+ and BRK- to delay this time brake work when the alarm is not conducting.	0~500 [80]
48	Motor brake off enable delay set off	The maximum value of 500 for the delay is 5 seconds, and the default is 0.8 second. It refers to the time when the normal driving comes to power, BRK+ and BRK-, disconnect the brake to enable off delay and does not work, the alarm will not be delayed.	0~500 [0]
49	The analog voltage threshold value speed control	Speed control: analog voltage positive and negative voltage threshold value setting.	[0]

Parameter No.	Parameter name	Detailed function	Parameter range [default]
50	Speed limit for torque control	a: Torque control equal to the maximum speed limit. Note: the phenomenon of speeding will show when has no load; b: Torque control: 10V corresponding to the speed switched by the PA42 to the second maximum analog limit speed;	1~5000 [2500]
51	Dynamic electronic gear	0: CN1 interface, the function of the input terminal INH (instruction pulse inhibit) is effective; 1: CN1 interface, the function of the input terminal INH (dynamic electronic gear switch) is effective. When the INH terminal OFF, the input of the electronic gear is PA12/PA13; when the INH terminal ON, the input of the electronic gear is PA52/PA13;	0~1 [0]
52	Second position command pulse frequency divide	When the PA51=1 command pulse is banned: When the INH terminal OFF, the input of the electronic gear is PA12/PA13; when the INH terminal ON, the input of the electronic gear is PA52/PA13;	0~32767 [1]
53	Low 4 bit input terminal forced ON input	Do not use the external line, with the change of the parameter 0, and1 to carry on the following functions of ON, OFF, the same as PA53, and PA54. SON: Servo ability; [0001] A-CLR: Alarm clearance; [0010] FSTP: CCW drive inhibit; [0100] RSTP: CW drive inhibit; [1000]	0000~1111 [0000]
54	High 4 bit input terminal forced ON input	CLE/SC1/ZEROSPD: The deviation of the counter is cleared / speed selection 1/ zero speed clamp [0001] INH/SC2: Instruction pulse prohibition / speed selection 2; [0010] FIL: CCW torque limit;[0100] RIL: CW torque limit.[1000]	0000~1111 [0000]

Parameter No.	Parameter name	Detailed function	Parameter range [default]
55	Low 4 bit input terminal logic	With the change of parameter 0 and1, achieve the function of the reverse (that is, the original external switch circuit input, which often turns to closed, and closed to open.) SON: Servo ability; [0001] A-CLR: Alarm clearance; [0010] FSTP: CCW drive inhibit; [0100] RSTP: CW drive inhibit; [1000]	0000~1111 [0000]
56	High 4 bit input terminal logic	With the change of parameter 0 and1, achieve the function of the reverse (that is, the original external switch circuit input, which often turns to closed, and closed to open.) CLE/SC1/ZEROSPD: the deviation of the counter is cleared / speed selection 1/ zero speed clamp; [0001] INH/SC2: Instruction pulse prohibition / speed selection 2; [0010] FIL: CCW drive inhibit; [0100] RIL: CW drive inhibit [1000]	0000~1111 [0000]
57	Output terminal logic	With the change of parameter 0 and1, achieve the function of the reverse (that is, the original external switch circuit input, which often turns to closed, and closed to open.) SRDY: Servo ready; [0001] ALM: Servo alarm; [0010] COIN: Position completion / speed arrival; [0100] BRK: Motor brake; [1000]	0000~1111 [0010]
58	Demo mode 2 time settings	When demo mode 2: Servo motor high-speed aging time setting. The unit is 0.1 minutes.	1~30000 [600]
59	Demo mode selection	When PA0=510, it comes into effect. 0: Close the demo mode; 1: Slow demo; 2: Quick demo;	0~2 [0]

Note

Hereby indicate:

- parameter structure default is PA-59 and it can be up to PA-299 in maximum, which needs to input the internal super password of the manufacturer or servo motor manufacturers password;

Chapter 7 Faults and Diagnosis

7.1 Alarming List (Table7.1)

Alarming code	Alarm name	Breakdown analysis
1	Over-speed	Servo motor speed exceeds the set value
2	Main circuit over-voltage	Three phase or two phase power supply voltage is too low or brake does not work
3	Main circuit under-voltage	Three phase or two phase power supply voltage is too low
4	position exceeding tolerance	The value of position deviation counter exceeds the set value, and the voltage is too low.
5	Motor overheating	Motor temperature is too high
6	Motor Locked Rotor	Motor is stuck, drive is not smooth, or the load is too large
7	Abnormal drive banning	CCW and CW have no input or the parameter PA20is not 1
8	Position deviation counter overflow	The absolute value of the position deviation counter is more than 230
9	Encoder fault	Encoder signal error
10	Software fault	Circuit board chip fault
11	IPM module fault	IPM intelligent module fault
12	Over-current	the current of motor is over-large
13	Overload	Drive and motor is over-load (instantaneous overcurrent), the transmission is not smooth
14	Brake fault	Bad brake resistor or brake circuit fault
15	Encoder counting error	Encoder count is wrong
16	Motor thermal overload	Motor electric heating value exceeds the set value
17	Speed response fault	Velocity error is large for a long time.
20	EEPROM error	EEPROM is wrong, parameter save failed
22	D/A Conversion chip error	Control board fault, D/A conversion chip is bad
23	Electricity leakage fault of shell	External short circuit or motor egocentricity leakage
29	User torque overload alarming	The motor load exceeds the value and duration set by the user.
30	Encoder Z pulse is missing	Encoder Z pulse is wrong

Note

7.2 Fault Handling (table 7.2)

Alarming code	Alarm name	Running state	Causes	Solutions
1	over-speed	Power on	Driver or motor fault	★change driver
			Check parameters	★check internal enabler
		Enabled	Short circuit between motor UVW	★check motor wiring
			Encoder 0 bit error	★Motor encoder zero clearance
			Servo parameter is wrong	★restore servo parameter
		The motor is running	Short circuit of motor interface	★check if there is water in motor connector
			Too fast Command speed	★decrease command speed
			Unstable acceleration and deceleration	★Adjust acceleration and deceleration constant
			Overlarge load	★reduce load
2	Over-voltage of main circuit	Power on	Power supply voltage is too high	★Reduce power supply voltage
			Power waveform is not normal	★Change power supply
			Servo fault	★Change servo
		Running	Circuit board fault	★Change servo
			Brake circuit fault	★check brake resistance
3	Under-voltage of main circuit	Power on	The main power supply voltage is too low	★Change power supply
			Circuit board fault	★Change servo
			Soft-starting circuit is bad	★Change servo
		Running	Transformer capacity is not enough	★increase transformer
			Power wiring is loose	★tighten wiring terminal
			Circuit board fault	★Change servo
4	Position deviation	Running	too fast command speed	★decrease command speed
			over-low input voltage	★check R/S/T power supply

			PA17 parameter can be too small	★increase parameter appropriately
			Wiring is loose or overloaded	★Check and fasten connection

Alarming code	Alarm name	Running state	Causes	Solutions
5	Motor overheating	Power on	Motor is damaged	★Replace motor
			Sensor wiring is disconnected	★Check wiring, change the sensor
		Running	Motor power is too small	★Replace high power motor
			The short circuit of motor interface	★Make better preparation of waterproof and dust prevention
			Wrong servo parameter	★Matched with the motor model
6	Motor Locked Rotor	Running	Drive part is stuck	★ Disengage the mechanical part
			Over-large load	★Reduce load
			Motor fault	★Replace motor
7	Abnormal banning	Power on	Check parameter and wiring	★PA20，CW and CWW wiring
8	Position deviation counter overflow	Running	Motor Locked Rotor	★Check load
			Abnormal command frequency	★Decelerate the upper machine speed
			Wrong wiring	★Check wiring, connect the shielding layer
9	Encoder fault	Power on	Encoder ABZ wiring is disconnected	★wrong wiring
			Encoder is damaged	★The fragile goods need to be replaced
			Encoder 5V voltage is low	★Reduce the wiring or change driver
		Running	CN2 plug exists bad contact	★Tighten CN2 plug
			Cable hidden weld	★Change cables
10	Software fault	Power on	Software burn and write does not match	★Upgrade software
			Circuit board chip fault	★Check interference, change servo
11	IPM module fault	Power on	Circuit board fault	★ change servo
			Motor UVW short circuit	★Check wiring, change the motor

			Running	Motor fault	★Check wiring, change the motor
				Poor electrical connection	★Check wiring, anti-interference
	12	overcurrent	Power on or Running	Motor is bad	★Change the motor
				UVW short circuit	★Check wiring, change the servo
				Over load	★Change high power drive motor

Alarming code	Alarm name	Running state	Causes	Solutions
13	Over load	Power on	Motor is damaged and inflected with water	★Replace motor
			Circuit board is bad	★Change servo
		Running	Mechanical overload	★Reduce load
			Poor mechanical drive	★Check mechanical drive parts
			There is short circuit between UVW	★Check cables
			The brake does not loosen	★Ensure that the brake power is stable
14	braking fault	Power on	Circuit board fault	★Change servo
		Running	Brake resistance is bad	★Check the brake resistance connection wiring
			Insufficient braking capacity	★Extend acceleration and deceleration time
			Too-large mechanical inertia	★Reduce mechanical inertia
15	Encoder UVW has count error	Running	Encoder does not work	★Replace encoder
			Encoder UVW connection wiring is wrong	★Check wiring and replace
			Encoder power supply is unstable	★Require the 5V voltage is stable
			Encoder line No. is wrong	★Adjust the parameters corresponding line No.
16	Motor thermal overload	Power on	Servo parameter is wrong	★Restore default
		Running	Poor mechanical drive	★Increase lubrication, reduce load
			Over load for a long time	★Reduce load, ensure the stable stop/start
17	Speed response	Running	Too-large error for a long time	★Adjust the parameters position

	fault			feedback
			Too-short up/ down time	★Adjust acceleration and

				deceleration time
20	ROM alarming	Running	Parameter storage alarming	★Restore parameter, change servo
22	D/A chip is bad	Power on	Replace control panel	★Restore parameter, change servo
23	electrical faults	Running	Short circuit or electric leakage in motor	★Check cables or replace motor
29	Inadequate torque	Running	Exceed the setting torque	★Check parameterPA30,PA31
			Check motor type	★Match the motor again
			Mechanical overload	★take off load and try again

Alarming code	Alarm name	Running state	Causes	Solutions
30	Encoder Z pulse is missing	Running	Z pulse does not exist	★Replace encoder
			The cable wire is wrong	★Check welding line
			The voltage 5V is unstable	★Shorten the connection to reduce attenuation
			Due to bad shielding, there is interference	★The shielding layer is connected to the ground better,
31	Encoder UVW signal is disconnected	Power on	There is no signal in UVW.	★Replace encoder
			Cable UVW welding line is disconnected	★Check welding line
			The voltage 5V is unstable	★Shorten the connection to reduce attenuation
			Due to bad shielding, there is interference	★The shielding layer is connected to the ground better
32	Encoder UVW signal angle is dislocated	Power on	The UVW pulse sometimes is full, sometimes is none	★Replace encoder
			The encoder code is wrong	★Check the encoder code
			The welding line of UVW is dislocated	★Check welding line
			The voltage 5V is unstable	★Shorten the connection to reduce attenuation
			Due to bad shielding, there is interference	★The shielding layer is connected to the ground better

- If the Alarm red light is on and the alarming No. "Err--xx" in the digital tube flashes, then the driver is in alarming state, and need to power off timely and find out the causes.

Chapter 8 Debugging and Application

8.1 Attentions for Quick Debugging

I. Ensure There Is No Error in Wiring

- R, S, T and U, V, W cannot be connected reversely, and there is no loosening phenomenon.
- If the input voltage of L series is a three-phase 220V, the input voltage of H series is three-phase 380V.
- Check the 18-pin of the interface CN1 are correctly connected with +24V, 36-pin, 9-pin and 0V, the electrode cannot be connected reversely.
- Check if CN2 interface is correctly connected with +5V, the electrode cannot be connected reversely.
- If there is short circuit or grounding in the connecting cables of motor
- The wiring of one motor must be matched with the same driver.

II. Ensure the Order of Electricity

- The strong electricity and controlling electricity of DO series servo should be powered on at the same time.
- If there is no servo control in brake motor, then assure the brake to be power on above one second after enabled, so can ensure the precision and safety of the equipment position.
- Because the integrated design of power and control of DO series servo, which includes cut-out delaying design of the control and display circuit, so the power should be cut off immediately after cutting off power, display and control circuit delay will discharge off automatically after a few seconds.

In order to operate the driver successfully, please read the following sequence chart carefully:

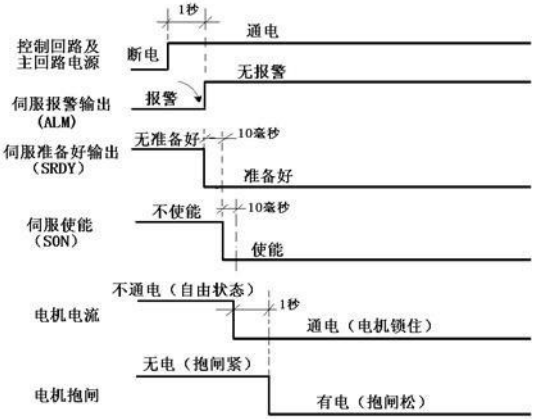


Figure 8.1 The sequence chart of power on and alarming

8.2 Position Control (Quick Adjustment after Power On)

For example: 1000C30L driver is matched with 130ST-M15015 motor (position control)

1. After power on, ensure there is no problem in the three-phase voltage among R, S and T.
2. The servo enabler signal is not connected, check if there is alarming, and see the red light (ALM). If there is no red light on, then we can proceed to the next step.
3. Start adapter parameter:

a. Enter the parameter management mode "EE--", press the "Enter" key for 3 seconds after enter "EE-def", when there is "Finish" appears, indicating that corresponding motor has restored the default and need to take effect by discharging.

b. After power on again, you can check several key parameters of the position control (see table 8.1) to determine the correctness, the upper computer can give the enable signal (or internal enabler), (Run) the green light is on giving the pulse. And the dynamic effect of the motor can be observed, and the characteristics of the gain adjusting motor can be modified appropriately.

PA--4	control model	→ the value of leaving factory is 0
PA-12	Electronic gear divider	→ the value of leaving factory is 1
PA-13	Electronic gear denominator	→ the value of leaving factory is 1
PA-20	Invalid drive inhibit	→ the value of leaving factory is 1
PA--5	Speed proportional gain	→ the value of leaving factory is 150
PA--6	Velocity integral time constant	→ the value of leaving factory is 20
PA—7	Torque filter	→ the value of leaving factory is
PA--8	Velocity detection filter	→ the value of leaving factory is 100
PA--9	Position proportional gain	→ the value of leaving factory is 40

Table 8.1 the key parameter adjustment of position control

8.3 Speed Control (Quick Adjustment after Power On)

For example: 1000C30L driver is matched with 130ST-M15015 motor (position control)

1. After power on, ensure there is no problem in the three-phase voltage among R, S and T.
2. Determine the right differential input or single-end input wiring of speed analog.
3. The servo enabler signal is not connected, check if there is alarming, and see the red light (ALM). If there is no red light on, then we can proceed to the next step.
4. Start adapter parameter:
   - **a.** Enter the parameter adjustment mode, change PA-0 to the password"385", then PA-1 as "51", which corresponds to the motor model code.
   - **b.** Enter the parameter management mode "EE--", press the "Enter" key for 3 seconds after enter "EE-def", when there is "Finish" appears, indicating that corresponding motor has restored the default and need to take effect by discharging.
   - **c.** After power on again, you can check several key parameters of the position control (see table 8.1) to determine the correctness, the upper computer can give the enable signal (or internal enabler), (Run) the green light is on, and will give analog signal after automatically returning to zero. And the dynamic effect of the motor can be observed, and modify the gain and zero drift value appropriately.

PA--4	--control code	→setting as 1
PA--20	--the drive inhabit is invali	→ the value of leaving factory is1
PA-22	--command selection of internal and external speed	→ setting as 1
PA-40	--Acceleration time constant	→ setting according to the requirements
PA-41	--Deceleration time constant	→ setting according to the requirements
PA-43	--command gain of analog speed	→setting according to the requirements
PA-45	--analog speed zero drift compensation	→setting according to the requirements

Table 8.2 the key parameter adjustment of speed control

8.4 Torque Control (Quick Adjustment after Power On)

For example: 1000C30L driver is matched with 130ST-M15015 motor (position control)

1. After power on, ensure there is no problem in the three-phase voltage among R, S and T.
2. Determine the right differential input or single-end input wiring of torque analog.
3. The servo enabler signal is not connected, check if there is alarming, and see the red light (ALM). If there is no red light on, then we can proceed to the next step.
4. Start adapter parameter:
    a. Enter the parameter adjustment mode, change PA-0 to the password"385", then PA-1 as "51", which corresponds to the motor model code.
    b. Enter the parameter management mode "EE--", press the "Enter" key for 3 seconds after enter "EE-def", when there is "Finish" appears, indicating that corresponding motor has restored the default and need to take effect by discharging.
    c. After power on again, you can check several key parameters of the position control (see table 8.1) to determine the correctness, the upper computer can give the enable signal (or internal enabler), (Run) the green light is on, and will give analog signal after automatically returning to zero. And the dynamic effect of the motor can be observed, and modify the gain and zero drift value appropriately.

PA--4	--	control model	→ setting as 1
PA--2	--	the drive inhabit is invalid	→ the value of leaving factory is1
PA-40	-	-Acceleration time constan	→ setting according to the requirements
PA-41	-	Deceleration time constant	→ setting according to the requirements
PA-43	-	command gain of analog speed	→ setting according to the requirements
PA-45	-	analog speed zero drift compensation	→ setting according to the requirements

Table 8.3 the key parameter adjustment of torque control

8.5 Dynamic Electronic Gear Application

- Mainly for position control applications.
- Dynamic electronic gear: it refers to during the servo driver operation, to determine the electronic gear ratio through the on-off state of the input terminal.
- It is mainly reflected in: The maximum output frequency limitation of the upper computer, when the ratio of the electronic gear is very small, the pulse resolution will be much higher, the maximum speed cannot reach. But in order to meet the maximum speed, the electronic gear ratio of PC will be bigger, the position resolution will be lower, while the lower resolution will affect the transmission accuracy (it may occur the cases that when there are 2 micron in the instruction system, the system will emit a pulse). In order to improve the speed and transmission accuracy, so we have added several electronic gear with different ratio for switching to achieve a better effect.
- For example, in the application of CNC machine tools, set the first electronic gear ratio as "1/1" "PA12/PA13", and the second electronic gear ratio as "10/1" "PA12/PA13"

G91 G01 X 10 F100 // the first electronic gear ratio1:1, 10 mm

M 16 // CNC machine tools M code PLC will output a point to enable there is a signal in INH.

G91 G01 X10 F100 //the second electronic gear ratio1:1, 100 mm

M17 //CNC machine tools M code PLC will close the INH signal

M30 //the end of the program

PA--4	--control mode	→	setting as 0
PA--2	--the drive inhabit is invalid	→	the value of leaving factory is1
PA-12	--Electronic gear divider	→	1
PA-13	--Electronic gear denominator	→	1
PA-52	--the second electronic gear divider	→	1

Table 8.4 The parameter adjustment of the electronic gear

8.6 The Typical Problems in Debugging

I. (Run) the enabler green light doesn't work

a. Check if the three-phase voltage among R, S and T is normal
b. If the CN1 is correctly connected with 18-pin, +24V.
c. If the CN1 is correctly connected with 10-pin, 0V.
d. After the above efforts, if the light still does not work, try the internal enabler PA53=0001 again.

II. "Err—9, Err—15, Err—30, Err—31, Err—32" The alarming cases of

Photoelectric encoder is a typical fragile sensitive component, and we need to pay attention to the protection in each step.
a. The above warning shows that there is a problem with the encoder or encoder wiring connection.
b. If the two terminals of the shielding layer are connected to the ground better, and if there is water or impurities in the plug.
c. Whether the too-long connection will cause attenuation to the 5V power supply of encoder power.
d. The interference problem, whether there have strong magnetic and power lines, if there are, please keep away from them as much as possible.

III. There appears shakes in the servo motor

a. Determine whether the load and inertia of the servo motor is within the allowable range of the motor.
b. adjust parameter PA-5, PA-6,PA-9。
c. Increase or decrease the parameter according to the shake differences in the high-speed or low-speed of the motor.

VI. There appear noises in the servo motor

a. Determine whether the load and inertia of the servo motor is within the allowable range of the motor.
b. Adjust parameter PA-5, PA-7, PA-8, PA-9.
c. Increase or decrease the parameter according to the noise differences in the high-speed, low-speed and stopping of the motor.

V. The setting of the electronic gear ratio

Take an example of CNC machine tool

a. The servo motor is connected with the leading screw (when the motor runs for a circle, the leading
b. screw rotates one
c. circle)

- If the program in the numerical control system is 10MM, it will send 10000 pulse.
- The photoelectric encoder is 2500 lines
- 6MM The leading screw pitch is 6MM

PA12 / PA13:
= (command value mm)*(the line No. in encoder)*(4 frequency double)/(screw pitch)*(pulse No.)
= 10*2500*4/6*10000
= 5/3

That is: PA12=5, PA13=3 ;

b. There is reduction gear box between the servo motor and leading screw (motor turns 5 turns, the leading screw turns 2
circles)

- If the program in the numerical control system is 10MM, it will send 10000 pulse.
- The photoelectric encoder is 2500 lines
- The leading screw pitch is 6MM

PA12 / PA13:
= (command value mm)*(the line No. in encoder)*(4 frequency double)*(No. of motor cycles)/(screw pitch)*(pulse No.)*(No. of leading screw)
= 10*2500*4*5/6*10000*2
= 25/6

That is: PA12=25, PA13=6;

Appendix 1

The driver matched with Siemens CNC system

（matched with Siemens 802S/801/802C/808D）

Parameter No.	Parameter name	Unit	Parameter range	Default
5	Speed proportional gain	Hz	50~2000	150
36	The filter coefficient of command pulse signal	%	0～3	1

1: The setting Requirements of the Driver Parameter

Note:

- With matched with SIEMENS system, the driver parameters PA37=0, PA36=1, otherwise it will affect the accuracy of repeated positioning.
- If the zero deviation is not consistent, the parameters No.5 can be increased to a certain extent.
- The 36-pin and 9-pin of the driver CN1 interface end must be connected with the shield and the system's metal shell. Otherwise, it will affect the precision of zero clearance.

Parameter No.	Parameter name	Required value
34040	seeking the Z pulse speed	500～2000

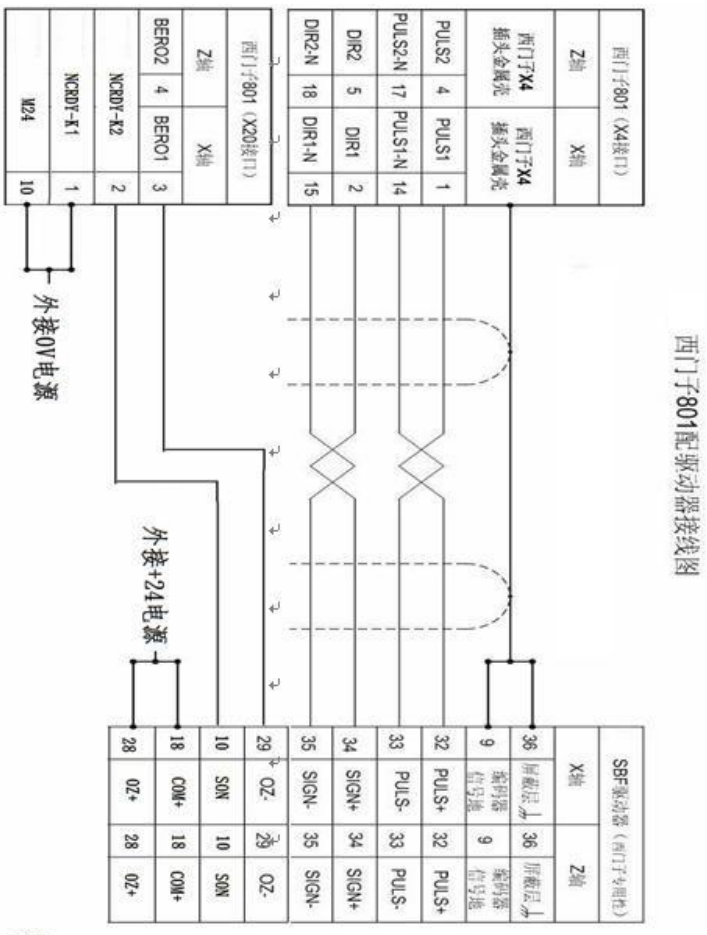
2: The setting requirements of SIEMENS system parameter are as follows

Note:

- If the zero deviation is not consistent, the parameters No. 34040 can be increased to a certain extent.

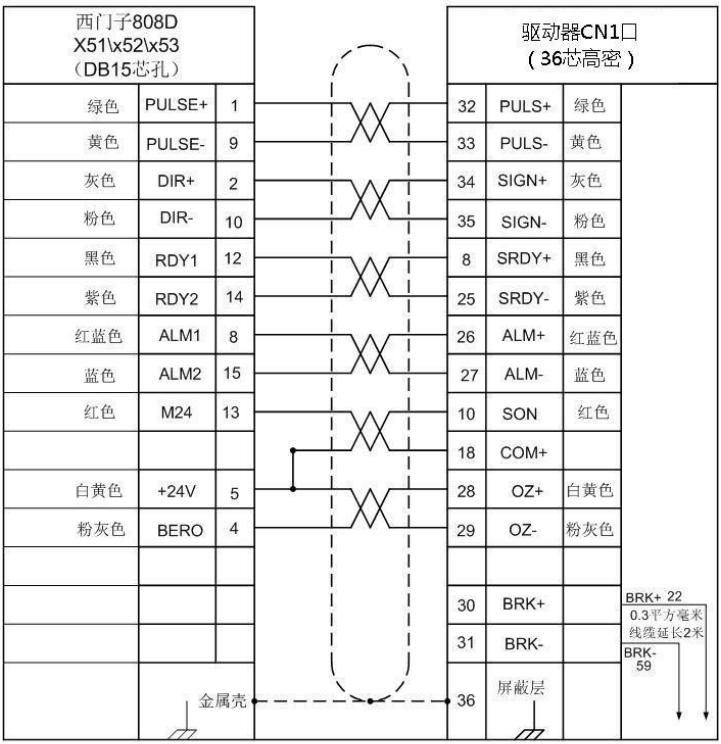
Appendix 2

The wiring graph of the driver matched with Siemens 801/802S system



Appendix 3

The wiring graph of the driver matched with Siemens 802D system



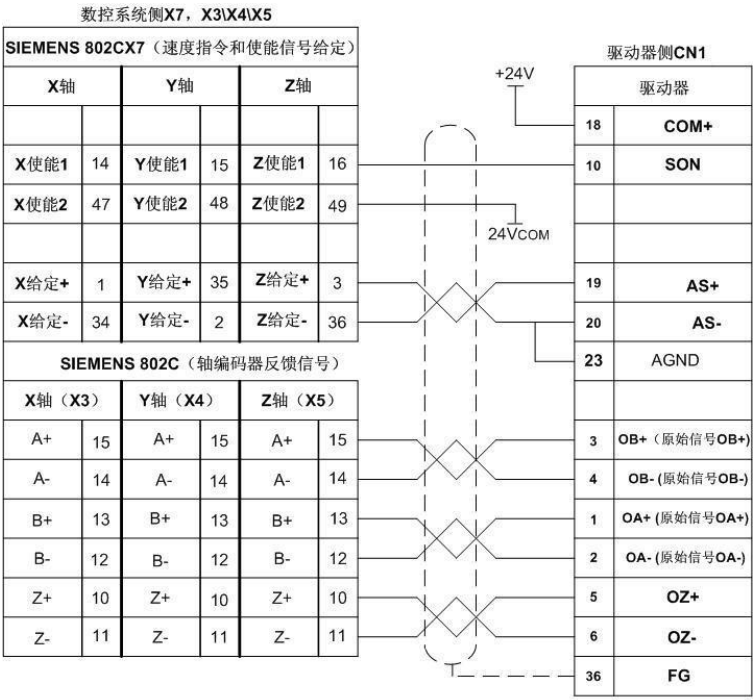
成对做线时，一根如上图纸做，一根30、31脚不用焊延长线。

驱动器参数修改：PA-36改为2，

PA-57修改方法：当 系统显示驱动器报警，而驱动器实际未报警，可修改此参数，方法为，将此参数的倒数第二位0000取反即可，即：1改0、0改1.

Appendix 4

The wiring graph of the driver matched with Siemens 802C system



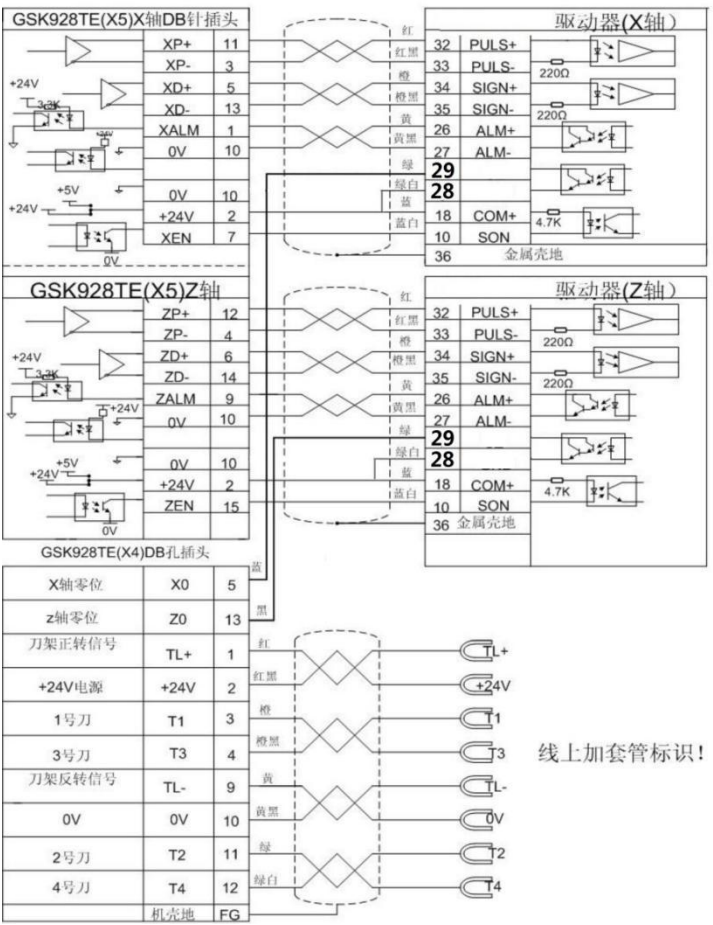
驱动器参数调整：**PA-4**调整为**1**、 **PA-22**调整为**1**、**PA-43**按需要设置

西门子**802C**系统参数调整：西门子**802C**系统的参数**30130**要改为“**1**”。

按以上接线图接好线后，先调整好以上参数，再系统上电，驱动器上电，打开驱动器使能，系统保持零速状态，调整驱动器**AU-Spd(**模拟量速度零偏自动调整）。调整方法为：在驱动器的第一层菜单界面找到**AU,**再按**enter**一次，显示**AU-Spd,**再按住**Enter**不放，并保持**3**秒，就会显示**FINISH**（成功），最后保存参数即可。

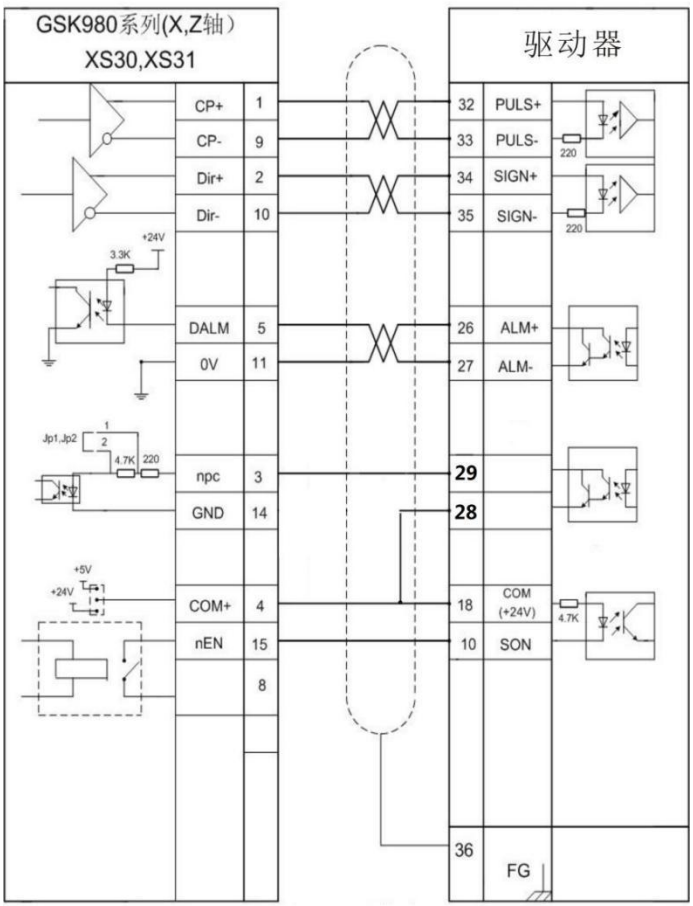
Appendix 5

The wiring graph of the driver matched with Guangshu 928 system



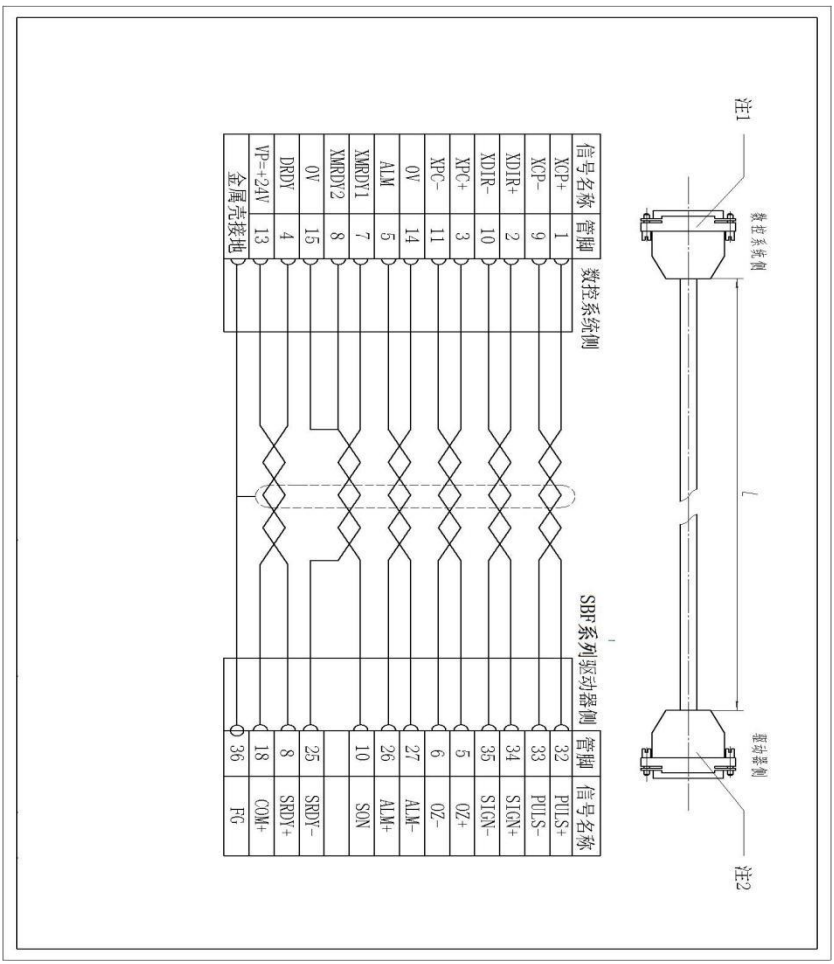
Appendix 6

The wiring graph of the driver matched with Guangshu 980 system



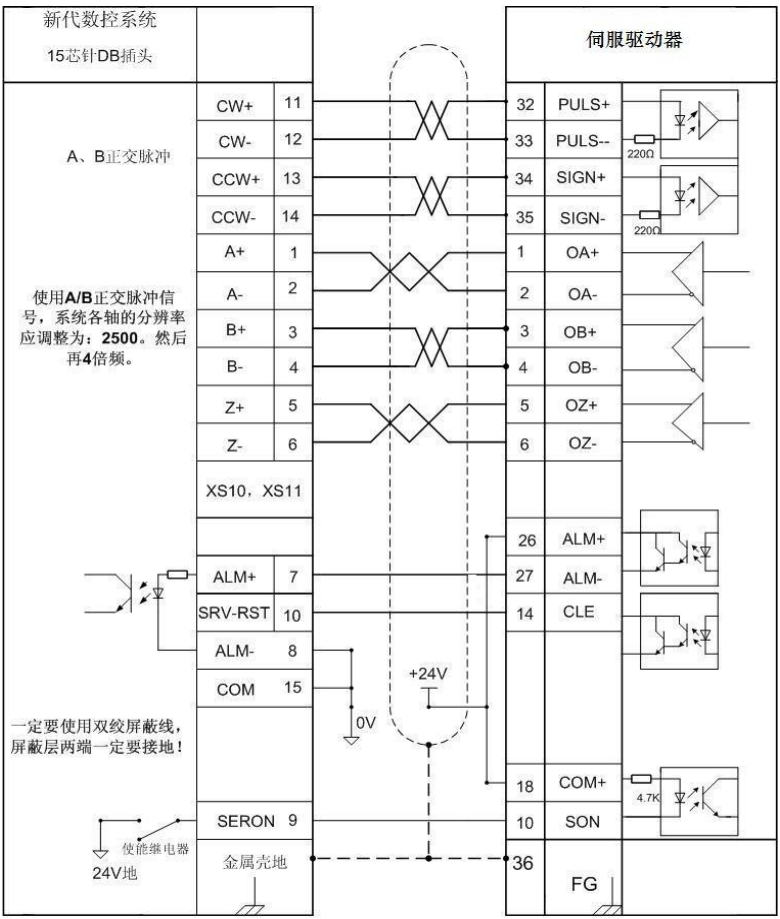
Appendix 7

The wiring graph of the driver matched with KND CNC system



Appendix 8

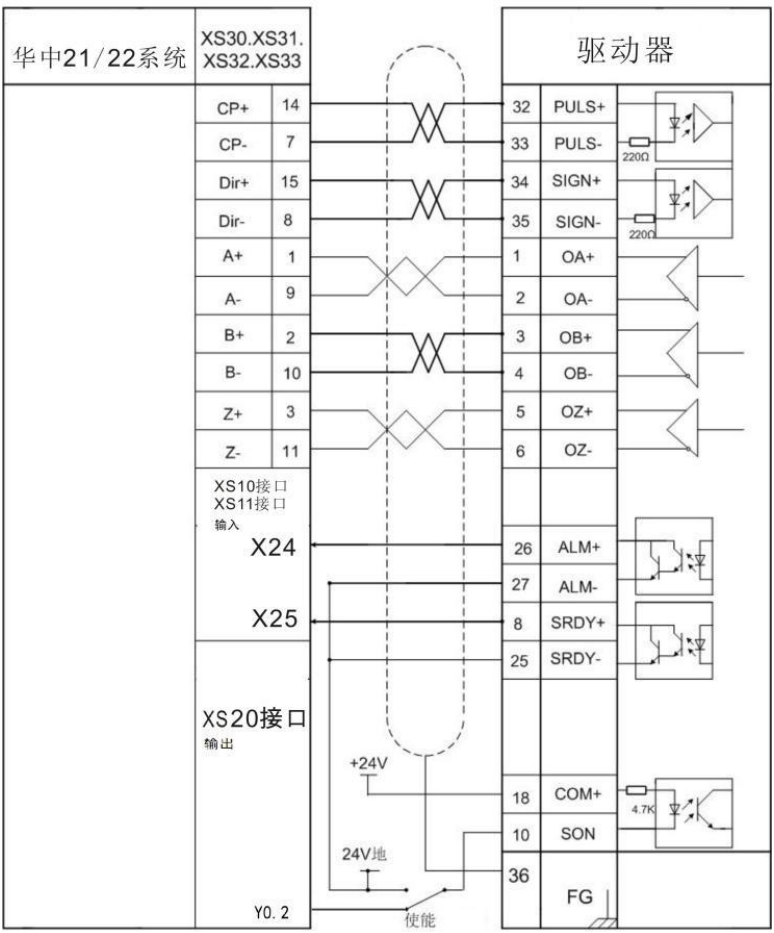
The wiring graph of the driver matched with Xindai EZ4 system



位置控制方式接线图

Appendix 9

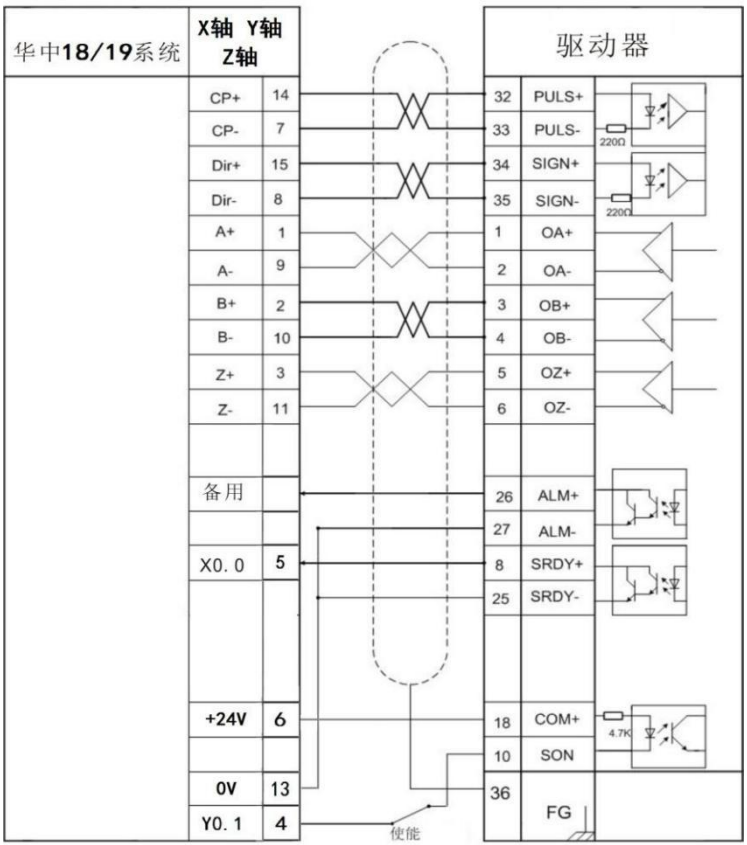
The wiring graph of the driver matched with Huazhong 21/22 system



位置控制方式接线图

Appendix 10

The wiring graph of the driver matched with Huazhong 18/19 system



位置控制方式接线图

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