ES700 High Performance AC servo drive



User Manual

Version change log

edition (P0-01)	Year and month	Amendments	remarks
V38	2025-04	- Added tension control parameters for PA group; - Added constant linear velocity mode to tension control; - The source of the torque mode speed limit is set by P4-08, and P4-00 is only valid for the speed mode. P4-09 is used as the internal speed limit value of the torque mode;	
V32	2024-12	- Increase the torque mode by controlling the direction of positive and negative torque; - When P4-16=1, the direction of torque mode is controlled by positive and negative torque; positive/negative AI can also control the direction of motor; - When P4-16=0, the direction of torque mode is controlled by positive and negative speed;	
V31	2024-11	- Increase the torque and speed mode to decelerate and stop the function when the enable is disconnected; at P3-17-1, disconnect the enable and press P4-02 to decelerate and stop. - Change P1-00=7 to mode 3 and mode 4 switch; at the same time, P4-00=3 is valid after switching; - When the RS485 communication command is 3 and two words are read, the contents of address 1309/1310 (0x051D/0x051E) are the same as that of fn28/fn29; compatible with the original DPX-P5 address; - Improve the tension control mode and add the coil diameter calculation function; refer to PA parameters for details;	
V29	2024-09	- Change the speed mode acceleration and deceleration time P4-01 and P4-02 to 10MS;	
V27	2024-08	- Add notch filter function, refer to the parameters of P3 group;	
V26	2024-07	- The weak magnetic function is increased, which is effective when P1-00=3; - Remove the restriction that the set value of P1-11 should not be less than 300;	
V25	2024-06	- Add the fault recording function, which is displayed by parameters P6-24~P6-29; - Change the data of parameter P3-02 to power-off retention;	
V15	2023-11	- When P1-00=16 is modified, the torque detection output DO function is 11; - Increase the minimum time P5-37 for torque detection to signal output, unit 0.1ms;	
V01	2022-11	Initial release	

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preface

Thank you for choosing our driver!

This manual will provide you with installation and debugging, operation and use, fault diagnosis and daily use and maintenance related matters. Please read carefully before installation and use. And keep it for reference and maintenance use.

PS700 series products are standard servo drivers based on pulse control, which can be equipped with 17-bit photoelectric or magnetic single or multi-turn absolute encoder. It has rich DI/DO functions, analog input, RS485 communication function, and three control modes: position control, speed control and torque control.

The PS700 series drives are designed with electromagnetic compatibility (EMC) to ensure strong anti-electromagnetic interference capability and comply with environmental requirements for low noise and low electromagnetic interference in the application site.

If the product is finally used as a military unit or used for weapon manufacturing, etc., the product will be listed as an object of export control under the Foreign Trade Law of the People's Republic of China. Strict examination and necessary export procedures shall be carried out when exporting.

If you encounter any problems in the use of this product, please contact our technical staff or local agents for consultation. Our professional technical staff will serve you with all sincerity and hope that you can continue to choose our products. Please give us your valuable comments and suggestions.

The company reserves the right to continuously improve the product without further notice.

Chapter 1 Product Information

1.1 Product inspection

Our products have been tested for complete functions and stability before leaving the factory. In order to prevent abnormality caused by negligence during transportation, please check the following items after unpacking:

Confirm the project	Reference method
Whether it is the product you want to buy	Please refer to the surface nameplate of the servo motor and driver.
Whether the servo motor shaft runs smoothly	It can be turned gently by hand, but the "brake motor" cannot be turned.
Whether the appearance of the servo driver and servo motor is damaged	Check the exterior for any damage or scratches. Do not connect the line to electricity if there is damage.
Are there any loose screws?	Check for loose or missing screws

If any of the above occurs, please contact us or your local dealer for a proper solution.

A complete set of servo components should include:

（1） A servo driver;
（2） A servo motor;
（3） A UVW motor power line; (the length is determined according to the contract)
（4） An encoder line (length to be determined according to the contract);
（5） The motor with the brake also has a brake line; (optional)
（6） A 44PIN connector for use with CN1; (welded control lines are optional)
（7） 485 communication line for CN3 and CN4 connection (optional)

1.2 Driver technical specifications

project		specifications	
essential parameter	Power Supply Voltage	S/3S type	Single phase/triple phase AC220V ±15%,50/60Hz
		T mould	Three-phase AC380V ±15%,50/60Hz
	rated current	AC220V	1.6~14A (see corresponding power driver for details)
		AC380V	3~30A (see corresponding power driver for details)
control model		Position control mode, speed control mode, torque control mode	
Encoder Resolution		17-bit absolute encoder (131072 pulses/revolution)	
Speed bandwidth response		Above 500Hz	
leak resistance		Built-in/outside (refer to the external brake resistor selection specification for continuous large inertia loads)	
defencive function		Overvoltage, undervoltage, overcurrent, overspeed, overload, driver overheating, encoder failure, excessive deviation, etc	
Use load inertia		10 times less than the inertia of the motor	
Parameter setting method		The keyboard input of the machine, the software download of the upper computer, and the 485 communication writing	
Signal configuration	control input	5 DI input signals, terminal function can be configured	
	Control output	3 road DO function output, the function can be configured	
	impulse input	Maximum pulse	The maximum differential input is 500Kpps, and the collector open circuit input is 200Kpps
		Pulse input mode	Pulse + direction
		Electronic gear ratio	1~32767/1~32767
	read analogue	Two analog inputs (speed or torque can be selected)	
	pulse output	No encoder feedback output	
	communica	RS485 (MODBUS-RTU protocol)	
	E24V power	The internal 24V power supply has a maximum output of 100mA	
	5V power supply	The internal 5V power supply has a maximum output of 200mA	
environment	temperatur	Working temperature: 0-45℃, storage temperature: -20-80℃ (not frozen)	
	humidity	Work/Save ≤ 90%RH (no condensation)	
	IP grade	IP20	
	height	Elevation <1000 m	
	vibrate	Vibration <4.5m/s2, 10~60Hz (do not work at the resonance point)	

1.3 Servo driver

1.3.1 Driver naming rules

PS700-S 0R7-X

1 2 3 4

1、表示驱动器系列；
2、S：单相220V；3S：三相220V；T:表示380V；
3、功率代码：0R1=100W 1R5=1500W
0R2=200W 2R0=2000W
0R4=400W 3R0=3000W
0R7=750W 4R5=4500W
1R0=1000W 5R5=5500W
1R2=1200W 7R5=7500W
4、非标代码，空表示标准产品；

1.3.2 driver nameplate

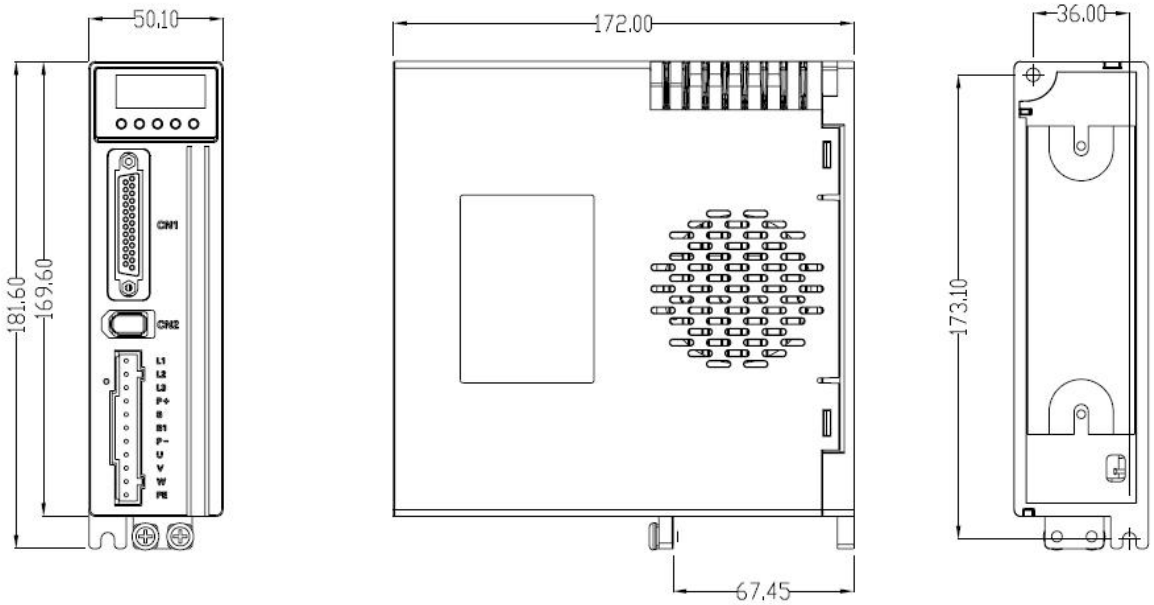


1.3.3 List of driver products

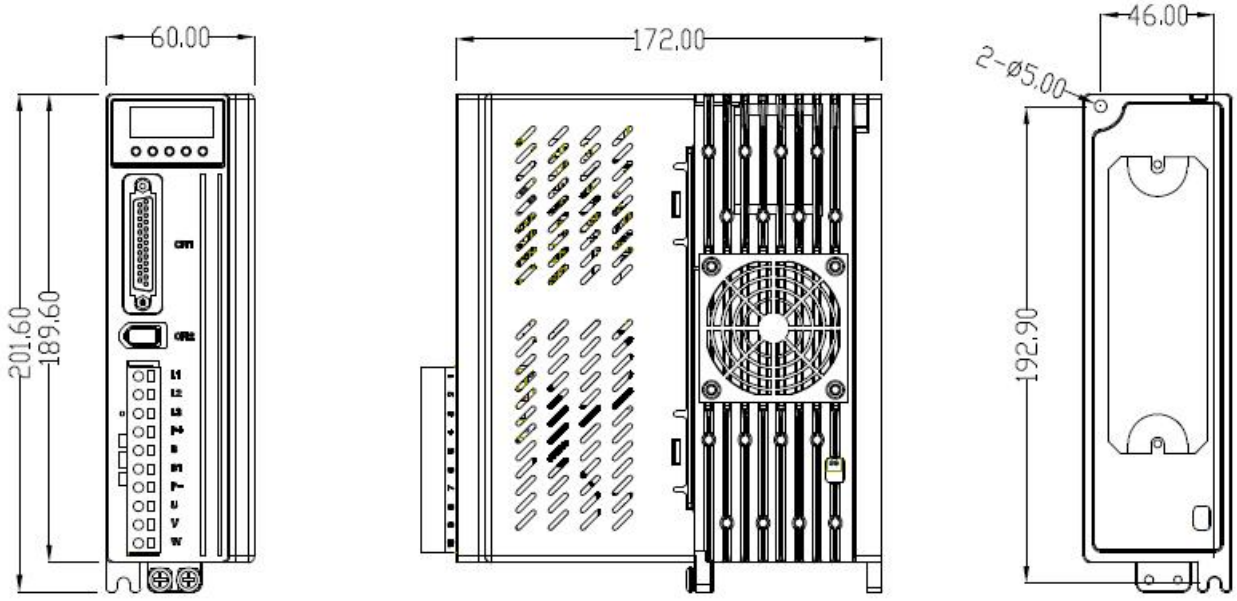
power	model	rated output current	maximum output current	net weight（KG）	rough weight（KG）	service voltage	structure size
0.1KW	PS700-S0R1	1A	3A	1.10	1.36	Single phase 220V	SIZE A
	PS700-3S0R1			1.11	1.37	Three phase 220V	
0.2KW	PS700-S0R2	1.6A	4.8A	1.10	1.36	Single phase 220V	
	PS700-3S0R2			1.11	1.37	Three phase 220V	
0.4KW	PS700-S0R4	3A	9A	1.10	1.36	Single phase 220V	
	PS700-3S0R4			1.11	1.37	Three phase 220V	
0.75KW	PS700-S0R7	4.6A	13.8A	1.10	1.36	Single phase 220V	
	PS700-3S0R7			1.11	1.37	Three phase 220V	
1KW	PS700-S1R0	5.5A	16.5A	1.12	1.38	Single phase 220V	
	PS700-3S1R0			1.13	1.39	Three phase 220V	
1.3KW	PS700-S1R3	6A	16.5A	1.12	1.38	Single phase 220V	
	PS700-3S1R3			1.13	1.39	Three phase 220V	
1.5KW	PS700-S1R5	8A	24A	1.45	1.61	Single/three phase 220V	SIZE B
2.3KW	PS700-S2R3	10A	30A	1.47	1.63		
3.0KW	PS700-S3R0	12A	30A	1.49	1.65		
1.3KW	PS702-T1R3	4A	12A	1.12	1.38	Three phase 380V	
1.5KW	PS702-T1R5	5.5A	16.9A	1.45	1.61		
2.3KW	PS702-T2R3	6A	18A	2.1	2.4		SIZE C
3.8KW	PS702-T3R8	8.8A	27A	2.1	2.4		
4.5KW	PS702-T4R5	12A	38A	5.34	6.18		SIZE D
5.5KW	PS702-T5R5	17AA	38A	5.34	6.18		
7.5KW	PS702-T7R5	21A	58A	5.34	6.18		
11KW	PS702-T11R0	25A	58A	5.34	6.18		

1.3.4 Driver size

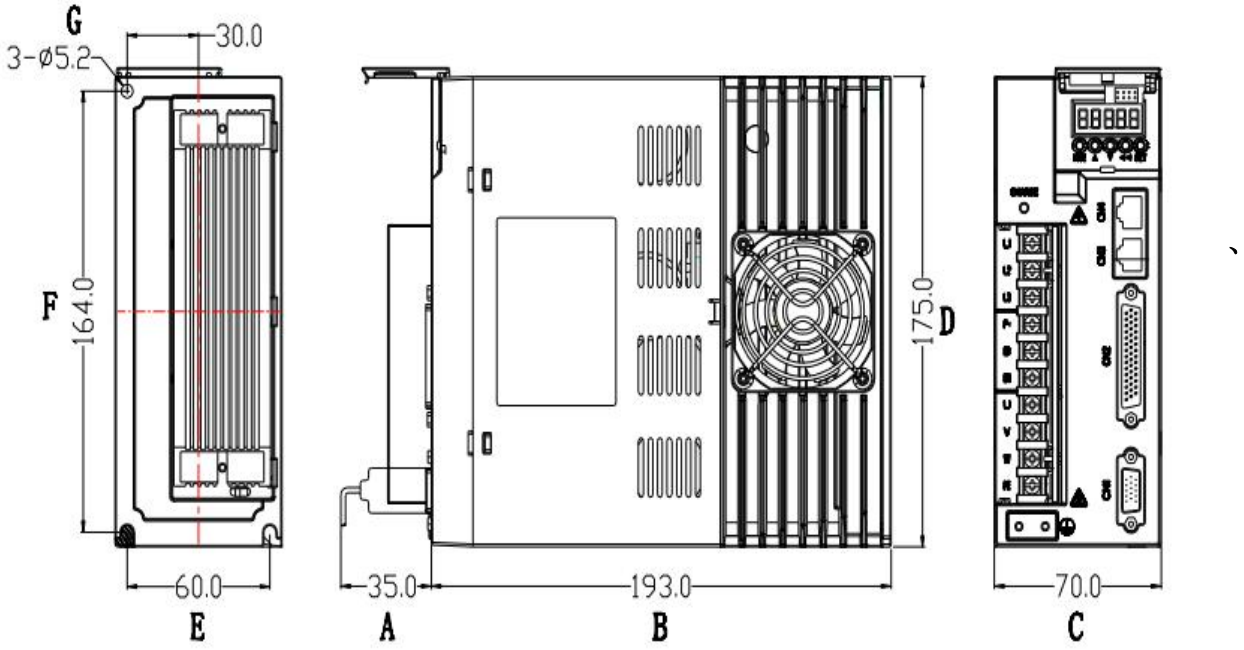
(SIZE A structure, 0.1~1.3KW, single phase/triple phase AC220V)



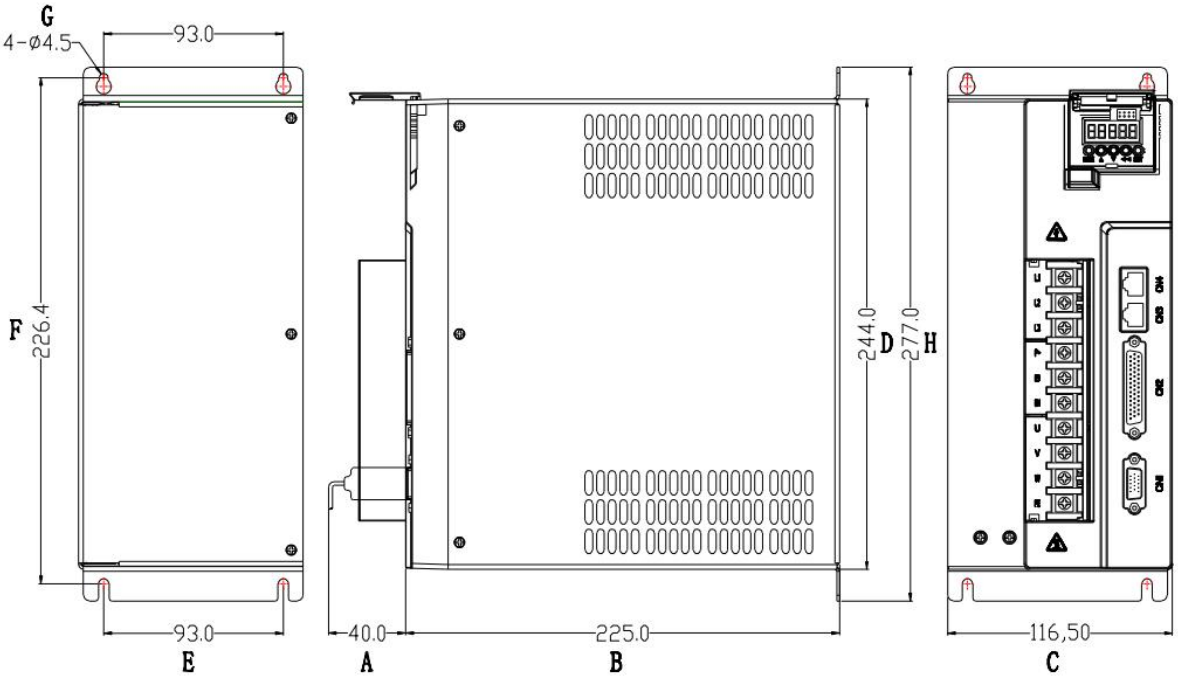
(SIZE B structure, 1.5~2.6KW, single phase/triple phase AC220V/triple phase 380V)



(SIZE C structure, 2.3~3.8KW, three-phase 380V)



(SIZE D Structure, 4~11KW, three-phase 380V)



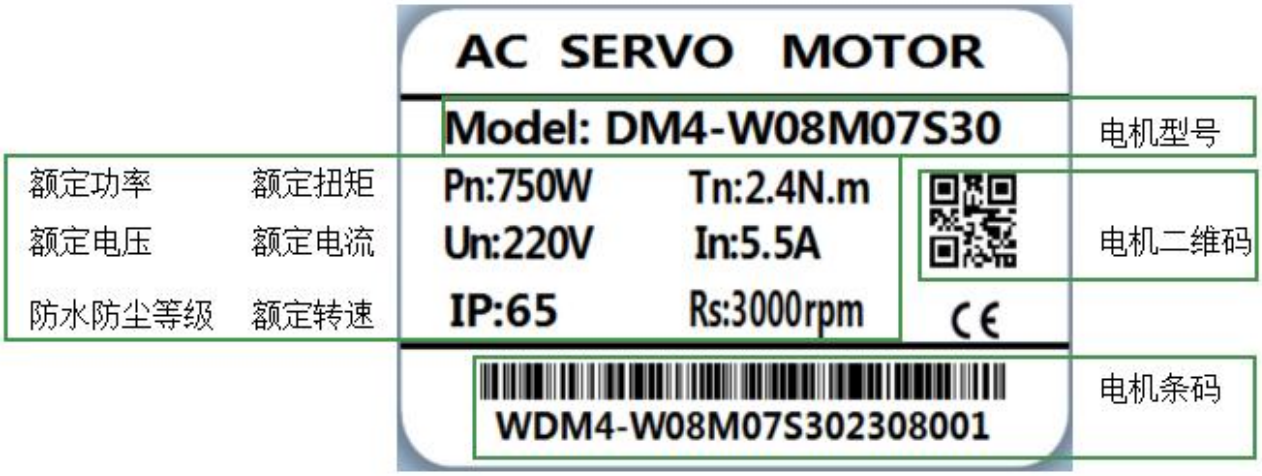
1.4 Servo motor

1.4.1 Motor naming rules

DM4-W08M07S30-BN
1 2 3 4 5 6 7 8 9 10 11

1、表示电机系列；
2、M=磁编码器；P=光电编码器；
3、4=单圈17位，5=多圈17位；
4、电机极对数，W=五对极，空表示四对极；
5、法兰尺寸：04=40、06=60、08=80、13=130、18=180；
6、电机惯量等级，M=中惯量，L=低惯量；H=高惯量；
7、功率代码：01=100W　15=1500W
02=200W　18=1800W
04=400W　20=2000W
07=750W　23=2300W
10=1000W　29=2900W
13=1300W　44=4400W
8、电压等级，S=220V,T=380V；
9、转速*100，15=1500转，20=2000转，30=3000转；
10、B=带抱闸电机；空表示标准电机；
11、非标代码，空表示标准产品；

1.4.2 Motor nameplate

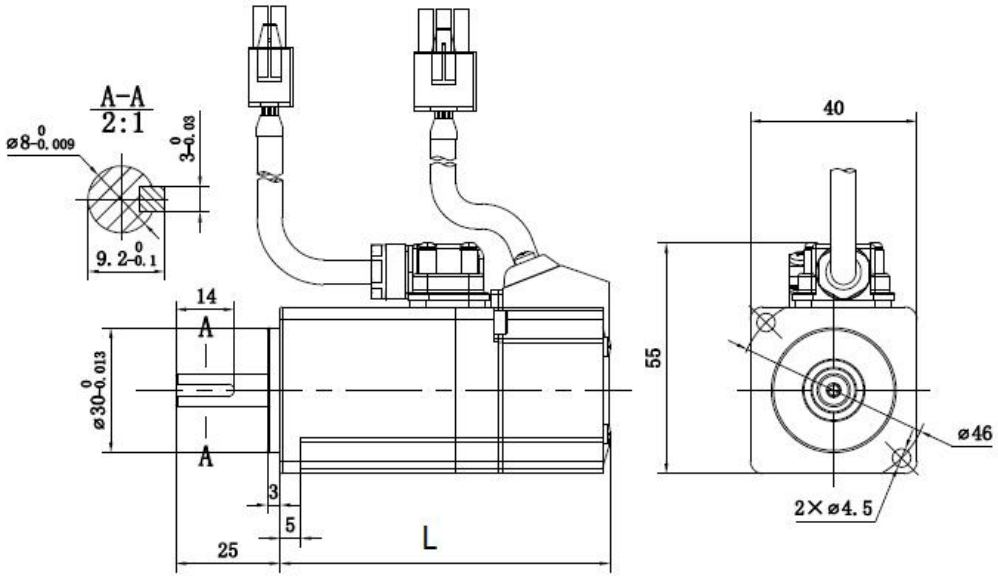


1.4.3 Common motor specification table

Motor specification parameters								Supporting driver
model	Rated power (KW)	rated current (A)	Rated torque (N.M)	net weight（KG）	rough weight（KG）	Rated speed (r/min)	Maximum speed (r/min)	model
DM4-W04M01S30	0.1	1	0.32	0.44	0.56	3000	5000	PS700-S0R1
DM4-W06M02S30	0.2	1.4	0.64	0.86	1.02			PS700-S0R2
DM4-W06M04S30	0.4	2.8	1.27	1.14	1.26			PS700-S0R4
DM4-W06M06S30	0.6	3.5	1.9	1.46	1.56			PS700-S0R7
DM4-W08M07S30	0.75	4.6	2.39	2.10	2.24			PS700-S0R7
DM4-W08M10S30	1	5.5	3.2	2.50	2.64			PS700-S1R0
DM4-W13L13S25	1.3	6.8	5.4	5.08	5.54	2500	3500	PS700-S1R3
DM4-W11M13L30	1.3	6.8	5.4	5.26	5.72	3000	4500	PS700-S1R3
DM4-W13L15S25	1.5	6.8	6	5.08	5.54	2500	3500	PS700-S1R5
DM4-W13L22S25	2.2	9.5	8.34	6.54	6.96			PS700-S2R3
DM4-W13L30S25	3.0	12	11.5	6.54	6.96			PS700-S3R0
DM4-W13L13T25	1.3	4.0	5	5.08	5.54	2500	3500	PS702-T1R3
DM4-W13L15T25	1.5	4.5	6	5.08	5.54	2500	3500	PS702-T1R5
DM4-W13L22T25	2.2	6.5	8.34	6.54	6.96	2500	3500	PS702-T2R3
DM4-13M23T15	2.3	5	15	12.3	12.9	1500	2000	PS702-T2R3
DM4-W13L30T25	3.0	8.2	11.5	6.54	6.96	2500	3500	PS702-T3R0
DM4-13M38T25	3.8	9.5	15	12.3	12.9	2500	3000	PS702-T3R8
DP5-18M45T20	4.5	9.5	21.5	18.4	23	2000	2500	PS702-T4R5
DP5-18M43T15	4.3	10	27	21.1	26.3	1500	2000	PS702-T4R5
DP5-18M55T15	5.5	12	35	25.6	31.6	1500	2000	PS702-T5R5
DP5-18M75T15	7.5	20	48	30.8	36	1500	2000	PS702-T7R5
DP5-20M110T15	11	25	70			1500	1700	PS702-T11R0
DP5-20M150T17	15	30	88			1700	1900	PS702-T15R0

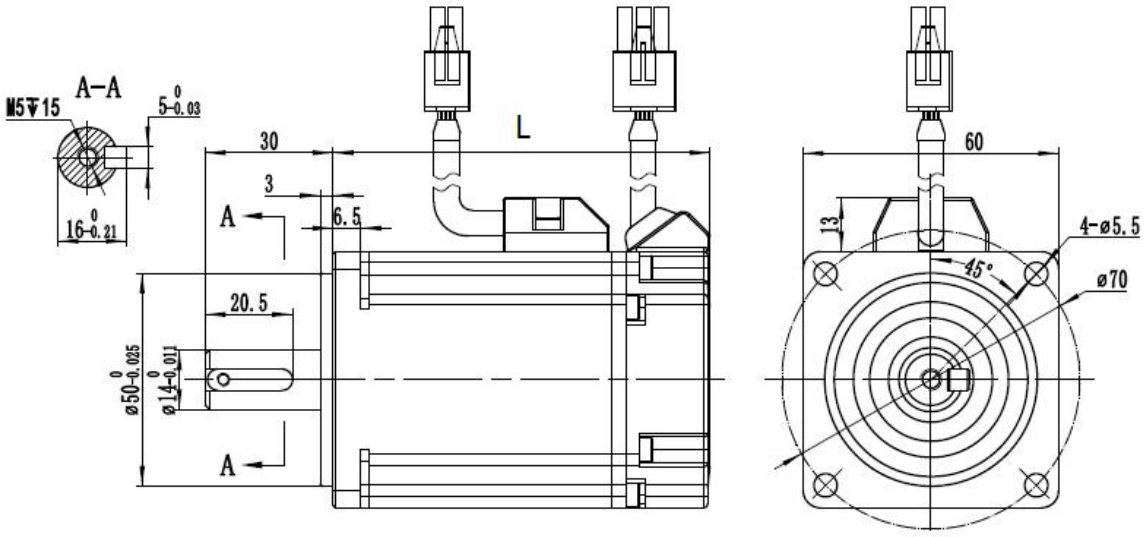
1.4.4 Common motor installation size

40mm motor:



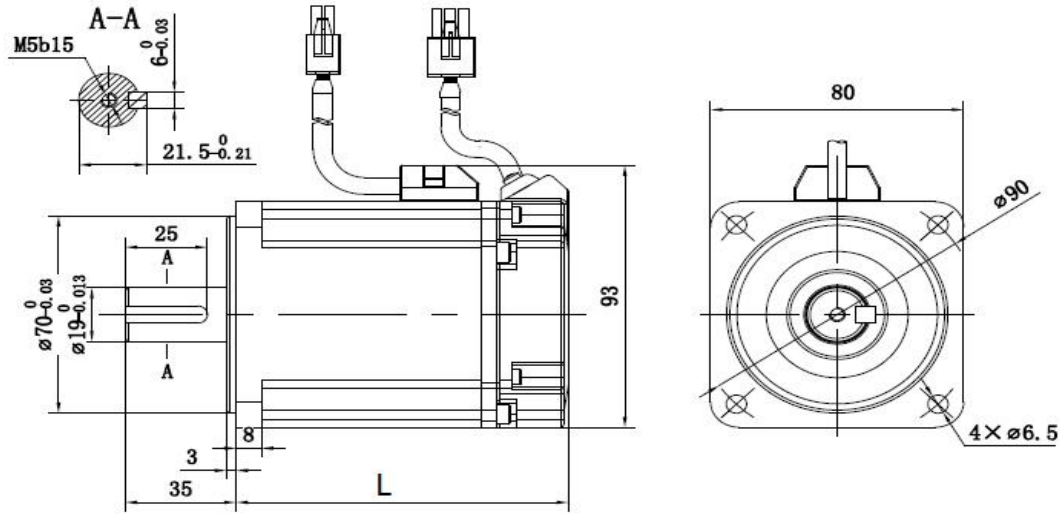
Motor model	power	L without brakes (mm)	L brake (mm)
DM4-W04M01S30	100W	80	113

60mm motor:



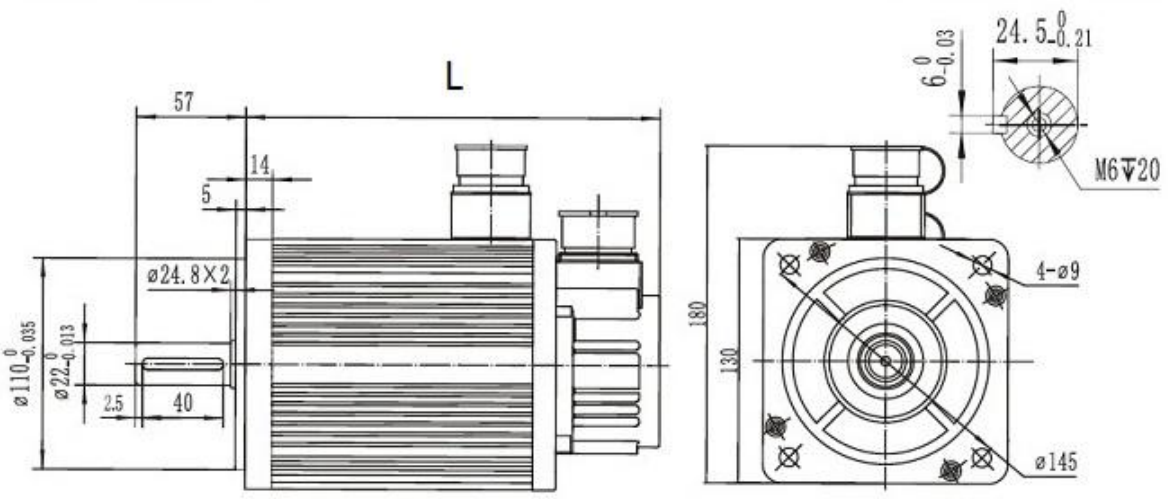
Motor model	power	L without brakes (mm)	L brake (mm)
DM4-W06M02S30	200W	77	109
DM4-W06M04S30	400W	94	126

80mm motor:



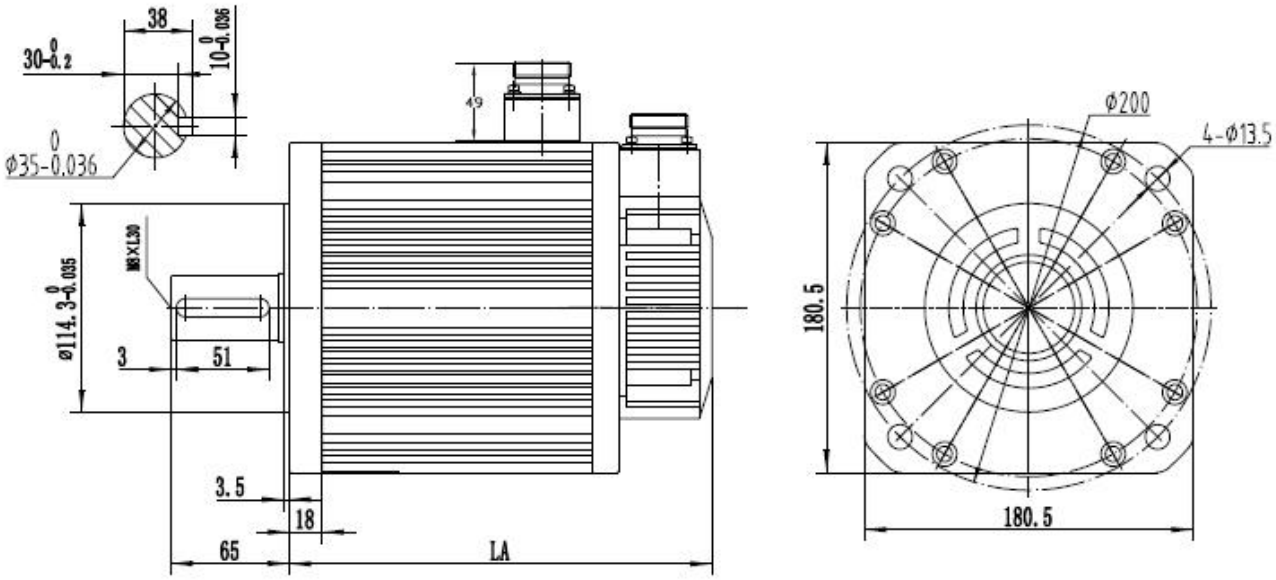
Motor model	power	L without brakes (mm)	L brake (mm)
DM4-W08M07S30	750W	105	142
DM4-W08M10S30	1000W	123	160

130mm flange motor:(length is based on the actual motor power)



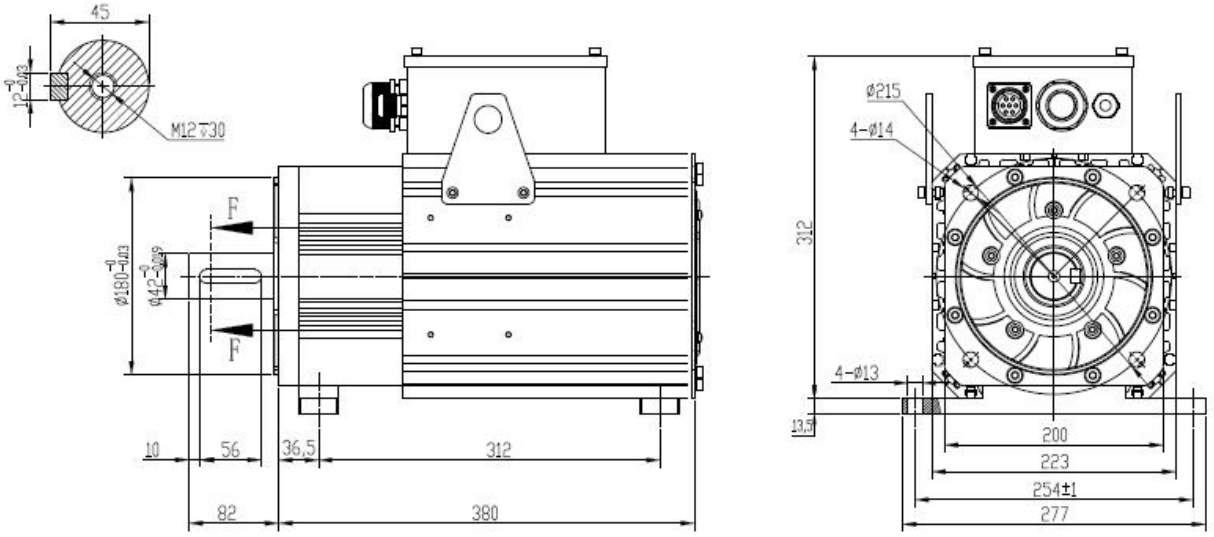
Motor model	power	L without brakes (mm)	L brake (mm)
DM4-W13L13S25	1.3/1.5KW	153	188
DM4-W13L22S25	2.2KW	178	212
DM4-W13L30S25	3KW	178	212

180mm flange motor:



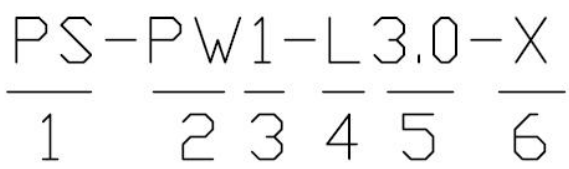
Motor model	power	L without brakes (mm)	L brake (mm)
DP5-18M30T15	3KW	205	252
DP5-18M45T20	4.5KW	215	262
DP5-18M43T15	4.3KW	232	279
DP5-18M55T15	5.5KW	260	307
DP5-18M75T15	7.5KW	305	352

200 flange motors: DP5-20M110T15 11KW motor DP5-20M150T17 15KW motor



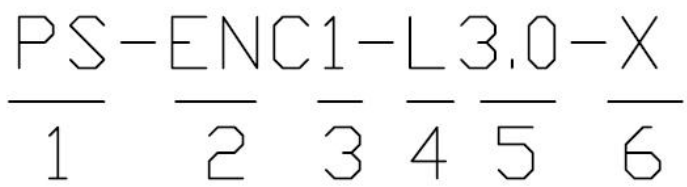
1.5 Supporting cables

1.5.1 Power line naming rules



1、PS系列线缆；
2、PW表示电源线（POWER）；
3、1=表示安普线，28=130以下航插线，32=180航插线；
4、L=普通线，H=高柔线；
5、线缆长度：3.0=3米，5.0=5米；
6、非标代码，空表示标准产品；

1.5.2 Code line naming rules

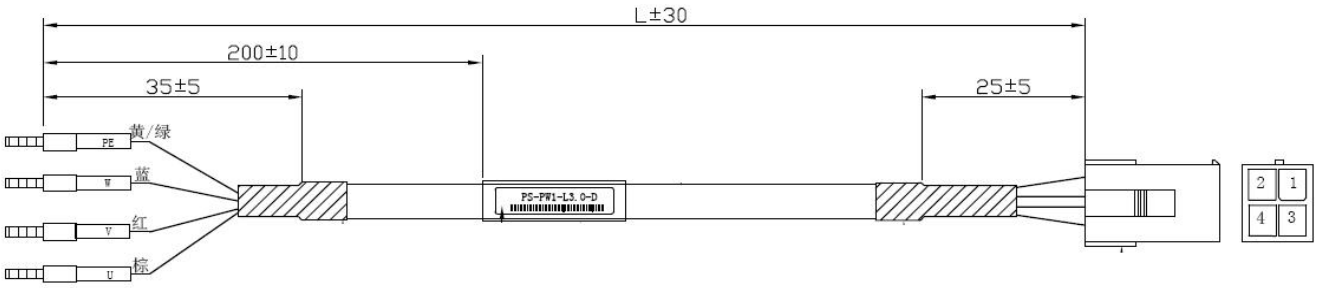


1、PS系列线缆；
2、ENC表示编码器线（ENCODER）；
3、1=表示安普插头线，14=小航插线，28=大航插线；
4、L=普通线，H=高柔线；
5、线缆长度：3.0=3米，5.0=5米；
6、非标代码，空表示标准产品；

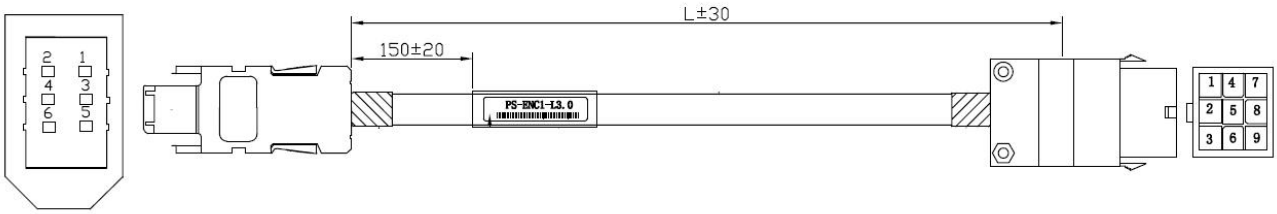
1.5.3 Cable model example table

project	Cable type	explain
power line	PS-PW1-M05-L3.0	Standard 3 meter power line
	PS-PW1-M05-H5.0	High flexibility 5m power line
Encoder line	PS-ENC1-L3.0	Standard 3 meter encoder line
	PS-ENC1-H5.0	High flexibility 5 meter encoder cable
Brake line	PS-BK1-L3.0-X	Standard 3 meter brake line
	PS-BK1-H3.0-X	High flexibility 3m brake line

Power line diagram:

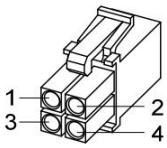


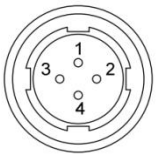
Encoder line diagram:



1.5.4 Cable wiring description

Definition of power line wiring at motor end:

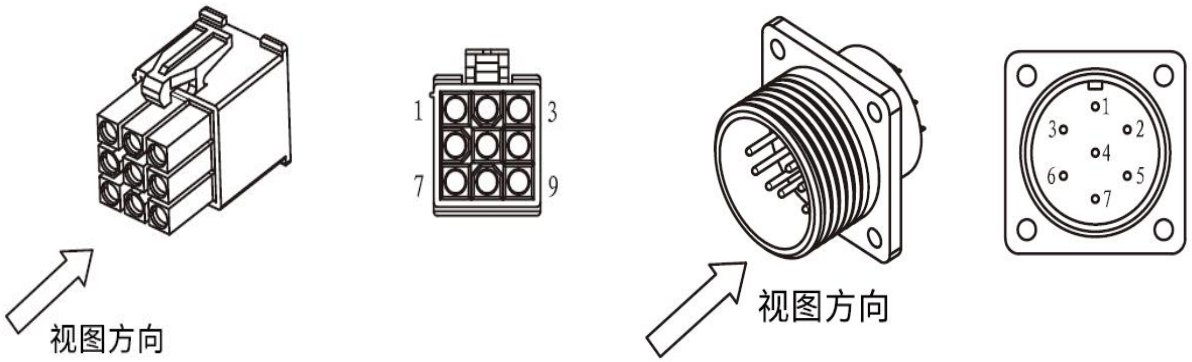




60/80 motor power line amp plug 110/130/180 motor power line aviation plug 60/80 motor power line amp plug 110/130/180 motor power line aviation plug

Signal name	Amperage plug foot position	Aviation plug pins	function
U	1	2	Motor U phase
V	3	4	Motor V phase
W	2	3	Motor W phase
PE	4	1	Motor earth wire

Motor end encoder wiring definition



subscript	1	2	3	4	6	5	7	8	9
function	PE	E-	E+	SD-	SD+	0V	+5V	NC	NC
explain	the earth	battery supply		data communications		5V power supply		continue to have	

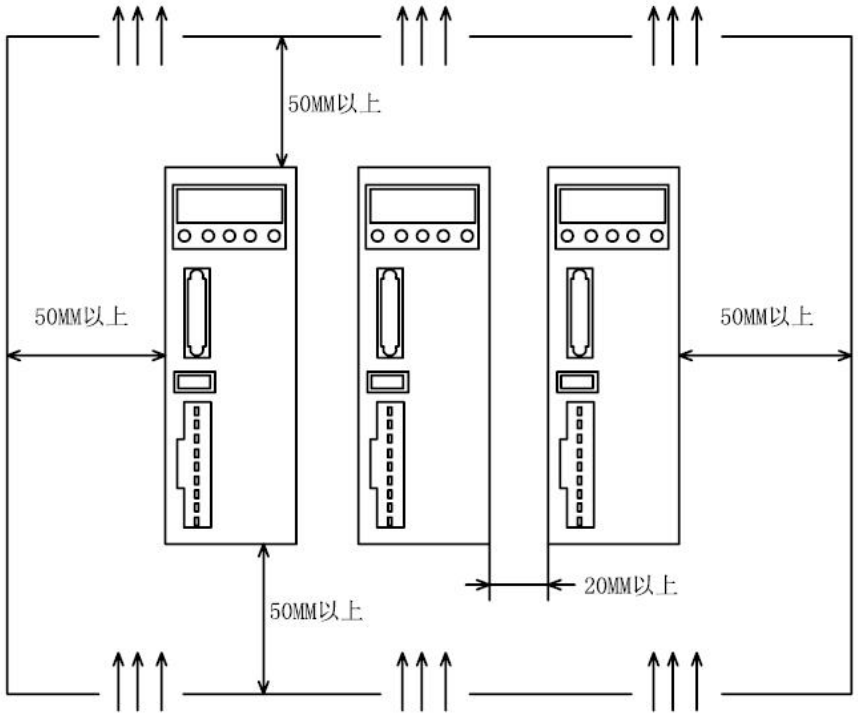
Chapter 2 Installation and Wiring

2.1 Installation of servo driver

2.1.1 Installation site and environmental requirements

project	Explanations	
peaceful dress a level open space So	Please install in the electrical cabinet without sun and rain;	
	Do not use this product near corrosive and flammable gases such as acid, alkali, salt, sugar, hydrogen sulfide, chlorine gas, sulfur, chlorinated gas, etc., and combustible materials.	
	Do not install in high temperature, humidity, a lot of dust, metal dust environment;	
	Do not install in violent vibration;	
loop border demand ask	ambient temperature	0—45 ℃
	ambient humidity	Below 90%RH (no condensation)
	vibrate	4.5M/S2 or less
	lash	15M/S2 or less
	levels of protection	IP10
	height	Below 1000M

2.1.2 Precautions for installation



1, must be installed vertically, preferably facing the operator;

2. The cabinet should have a cooling fan, preferably installed on the driver facing the external exhaust. A circulating air path is formed in the cabinet with cold air entering from below and being extracted from above.

3. The driver should leave space in the cabinet. Especially when multiple units are installed, the left and right spacing should not be less than 20MM, and the upper and lower spacing should be 50MM.

4, must ensure that the driver is reliably grounded, otherwise there will be electric shock or interference.

2.2 Installation of servo motor

2.2.1 Installation site

1. Do not use this product near corrosive and flammable gases such as acid, alkali, salt, sugar, hydrogen sulfide, chlorine gas, sulfur, chlorinated gas, etc., and combustible substances.

2. In the case of cutting fluid, oil mist, metal powder and other occasions, it is necessary to select a motor with oil seal or add a protective cover;

3, away from heating furnace, oven and other heat source occasions;

4, can not install the motor in a closed place, otherwise it will lead to high temperature, resulting in burning out the motor or reducing the service life;

project	explain
Use ambient temperature	-20℃~40℃ (no freezing at negative temperature)
Use ambient humidity	20%~90%RH (no condensation)
Storage temperature	-20 ℃~50 ℃
Storage humidity	20%~90%RH (no condensation)
vibrate	4.5M/S2 or less
lash	450M/S2 or less
Protection and other lines	IP65 (except for the wire connection part)
height	Below 1000M (over 1000M should be used at reduced capacity)

2.3 Power wiring requirements

2.3.1 Wiring precautions

	1)Wiring should be performed by professional technicians with proper safety measures in place; 2) To avoid electric shock, wait at least 5 minutes after the power is turned off before disassembling or assembling the driver; 3) Ensure that the power supply is off when performing wiring work; 4) Install all terminal blocks with insulating sleeves as per the specifications to prevent accidental electric shock or short circuits; 5) Select cables according to the specified power and current ratings. Use dedicated yellow-green dual-color ground wires. 6) When installing, debugging, or maintaining, implement safety precautions, such as hanging maintenance signs and assigning a dedicated person for supervision;
 danger	1) Wiring should be performed by professional technicians with proper safety measures in place; 2) To avoid electric shock, wait at least 5 minutes after the power is turned off before disassembling or assembling the driver; 3) Ensure that the power supply is off when performing wiring work; 4) Install all terminal blocks with insulating sleeves as per the specifications to prevent accidental electric shock or short circuits; 5) Select cables according to the specified power and current ratings. Use dedicated yellow-green dual-color ground wires. 6) When installing, debugging, or maintaining, implement safety precautions, such as hanging maintenance signs and assigning a dedicated person to monitor;
 pay attention to	1) Wiring should be performed by professional technicians with proper safety measures in place; 2) To avoid electric shock, wait at least 5 minutes after the power is turned off before disassembling or assembling the driver; 3) Ensure that the power supply is off before performing wiring work; 4) Install all terminal blocks with insulating sleeves as per the specifications to prevent accidental electric shock or short circuits; 5) Select cables according to the specified power and current ratings. Use a dedicated yellow-green dual-color ground wire. 6) When installing, debugging, or maintaining, implement safety measures such as hanging maintenance signs and assigning dedicated personnel for supervision;

	1) Wiring should be performed by professional technicians with proper safety measures in place; 2) To avoid electric shock, wait at least 5 minutes after the power is turned off before disassembling or assembling the driver; 3) Ensure that the power supply is off when performing wiring work; 4) Install all terminal blocks with insulating sleeves as per the specifications to prevent accidental electric shock or short circuits; 5) Select cables according to the specified power and current ratings. Use dedicated yellow-green dual-color ground wires. 6) When installing, debugging, or maintaining, implement safety precautions, such as hanging maintenance signs and assigning a dedicated person for supervision; 1) Wiring should be performed by professional technicians with proper safety measures in place; 2) To avoid electric shock, wait at least 5 minutes after the power is turned off before disassembling or assembling the driver; 3) Ensure that the power supply is off before performing wiring work; 4) Install all terminal blocks with insulating sleeves, following standard procedures, to prevent accidental electric shock or short circuits; 5) Select cables according to the specified power and current ratings. Use a dedicated yellow-green dual-color ground wire. 6) When installing, debugging, or maintaining the equipment, implement safety measures, such as hanging maintenance signs and assigning a dedicated person to monitor;

2.3.2 Wiring instructions

1) The selected cable specification should comply with the electrical specifications;

2) Do not connect the input power line to the output end UVW of the driver, otherwise the driver will be burned out;

3) The three-phase UVW of the motor must be connected to the UVW defined by the driver, otherwise the motor will fly or not turn;

4) In order to prevent the interference or influence of other weak electrical equipment in the same power supply, please add isolation transformer, noise filter and other devices to the power supply.

5) Please use a non-fusing circuit breaker as the power supply switch of the driver, which can cut off the power supply in time when the driver is abnormal;

6) The driver must be reliably grounded and use the single point grounding method. The cross-sectional area of the ground wire is the same as or greater than that of the main circuit;

7) Selection of main power supply and motor cable In general, the allowable current density of wire is less than 40 degrees Celsius in the ring temperature, and the normal heat dissipation condition does not exceed 8A/square;

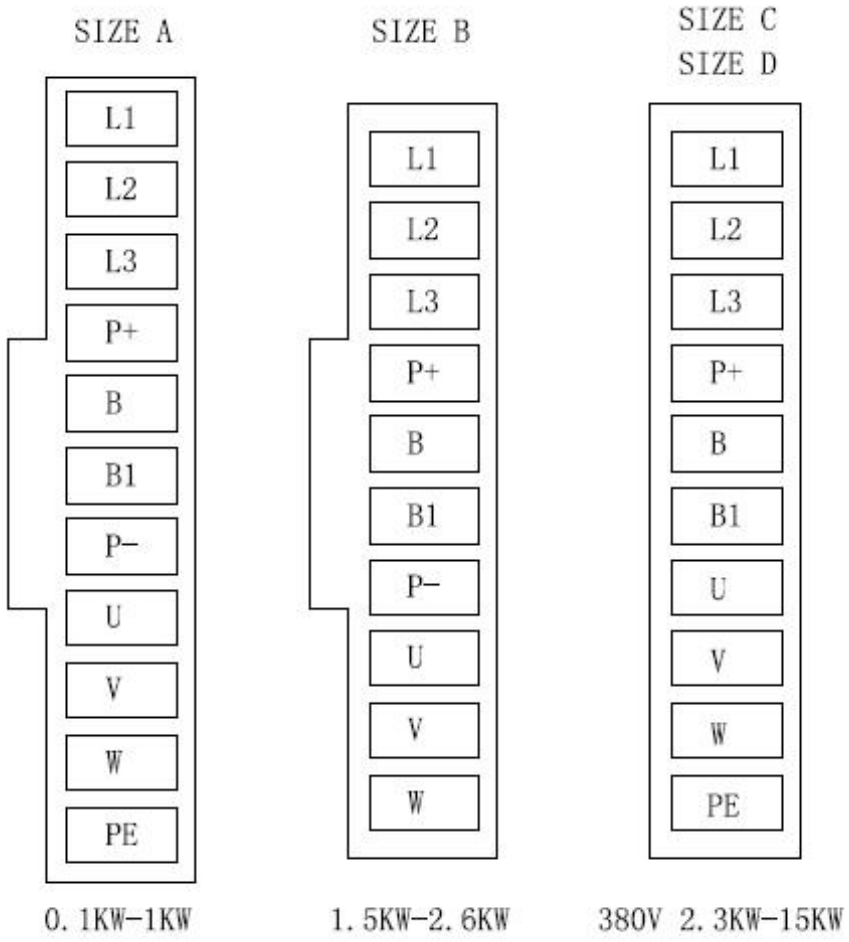
8) When wiring, do not put the motor power line and control signal line in the same cable trough or tie together, to avoid interference should be separated more than 30CM;

9) Please ensure that the wire is crimped or the screw is locked. Power on when loose may cause fire.

10) Even if the power supply is turned off, high voltage will remain in the driver. Do not touch the power terminal within 5 minutes;

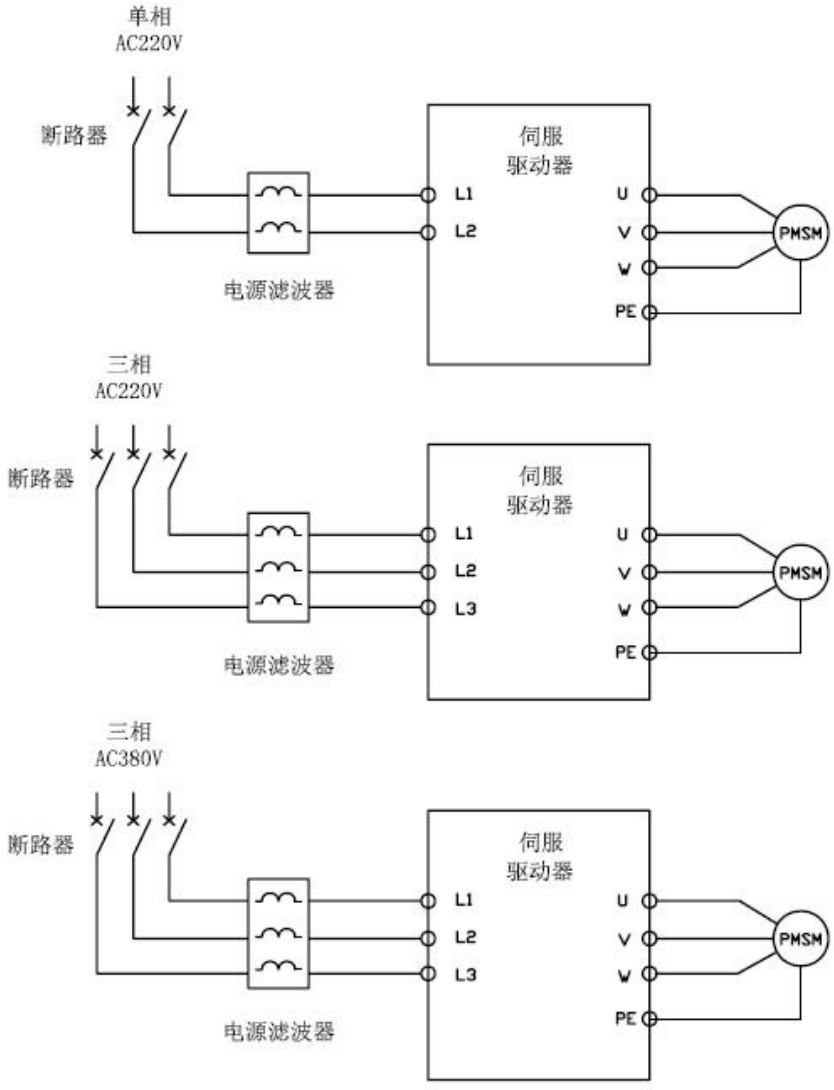
2.4 Definition of main circuit wiring

2.4.1 Definition and description of power terminals



Terminal symbols	Terminal name	explain
L1、L2、L3	Power input terminals	Single phase connection: L1, L2 terminals; three phase connection: L1, L2, L3
P+、P-	Internal DC bus terminal	P+ busbar positive voltage, P-busbar negative voltage (SIZE C/D two 380V drives have no P-terminal)
B、B1	Select terminals for braking resistance	SIZE A/B defaults to P+ and B being shorted, SIZE C defaults to B and B1 being shorted using an internal braking resistor. SIZE D There is no internal resistor. When the load inertia is large, remove the short circuit line between P+ and B, and connect the external resistance to the terminals of P+ and B1.
U、V、W	Motor power terminal	It must be connected to the UVW of the motor
PE	Power ground	The driver has two external grounding terminals, which are mainly connected to the motor grounding terminals.

2.4.2 Power wiring example

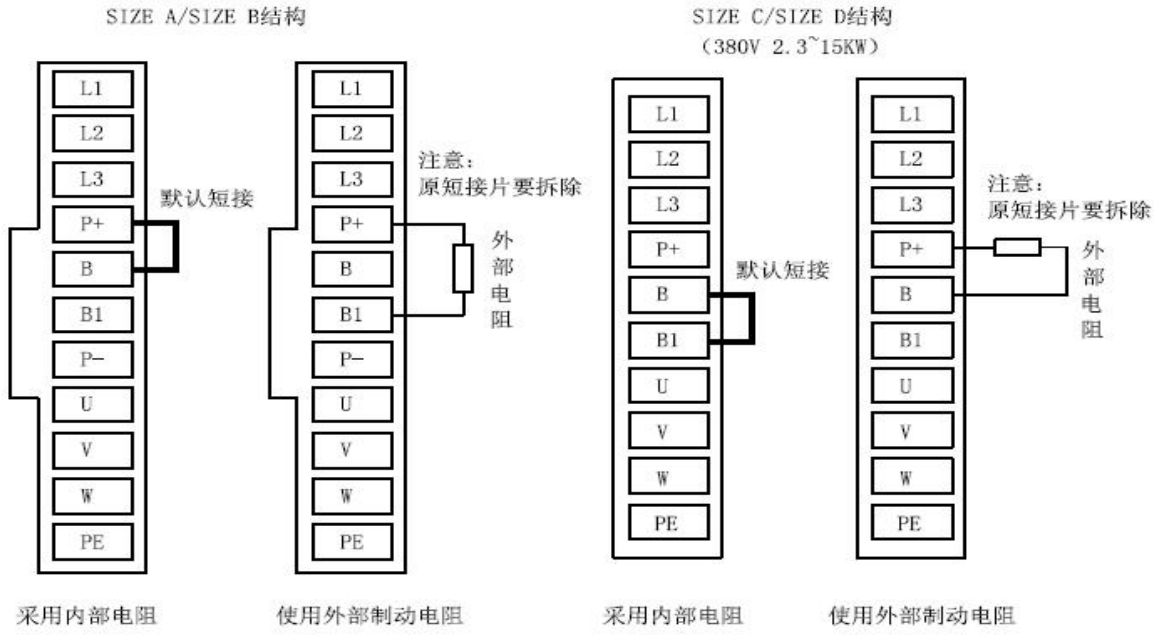


explain:

1. When using single-phase AC220V power supply, the power input is connected to L1 and L2 terminals; for single camera model, L3 is an empty foot;

2. AC220V driver 1.5KW~3.8KW The driving standard is three-phase power input. When using single-phase power, L1\L2\L3 can be connected to two phases at will;

2.4.3 Selection and wiring example of brake resistor



Precautions for connecting the braking resistor:

1) The external braking resistor must not be connected to the P+ and P-terminals, otherwise it will burn out the driver or cause the resistance to burn and fire;

2) When using external braking resistor, it is necessary to remove the short circuit between P+ and B, otherwise the driver will be burned;

3) The heat generated by the external braking resistor may be very large. Pay attention to heat dissipation and scald people or articles; do not get close to flammable items;

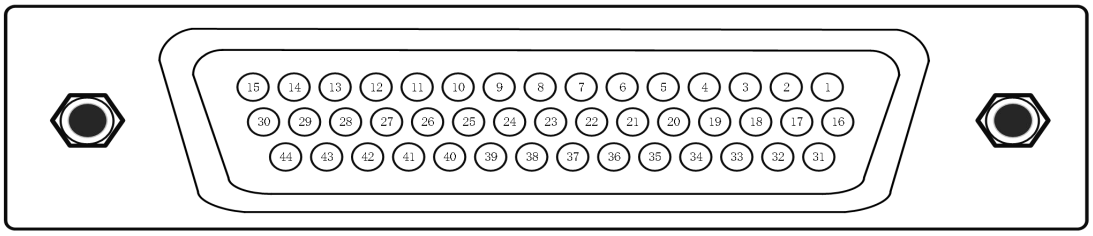
Reference for selecting resistance:

The power of the braking resistor is related to the load inertia, running speed and acceleration and deceleration time. The resistance value of the braking resistor is selected according to the reference standard: the driver of 220V power supply should not be lower than 40Ω, and that of 380V power supply should not be lower than 60Ω; in addition, the resistance value is too high to affect the braking effect.

voltage	Drive power	Built-in braking resistor specifications		External braking resistor specifications		Allow minimum resistance value
		resistance value	power	resistance value	power	
220V	0.1—0.4KW	50Ω	60W	50Ω	300W	40Ω
	0.75—1KW	50Ω	60W	50Ω	500W	40Ω
	1.3—2KW	50Ω	60W	50Ω	1000W	50Ω
	2.3—3.8KW	50Ω	60W	50Ω	1500W	50Ω
380V	1.5—2.6KW	100Ω	60W	80Ω	1200W	60Ω
	3—3.8KW	80Ω	200W	80Ω	2000W	60Ω
	4—5.5KW	not have		80Ω	3000W	60Ω
	7.5—11KW	not have		80Ω	5500W	60Ω

2.5 Driver control port definition:

2.5.1 Pin diagram of CN1 interface DB44 on the driver side

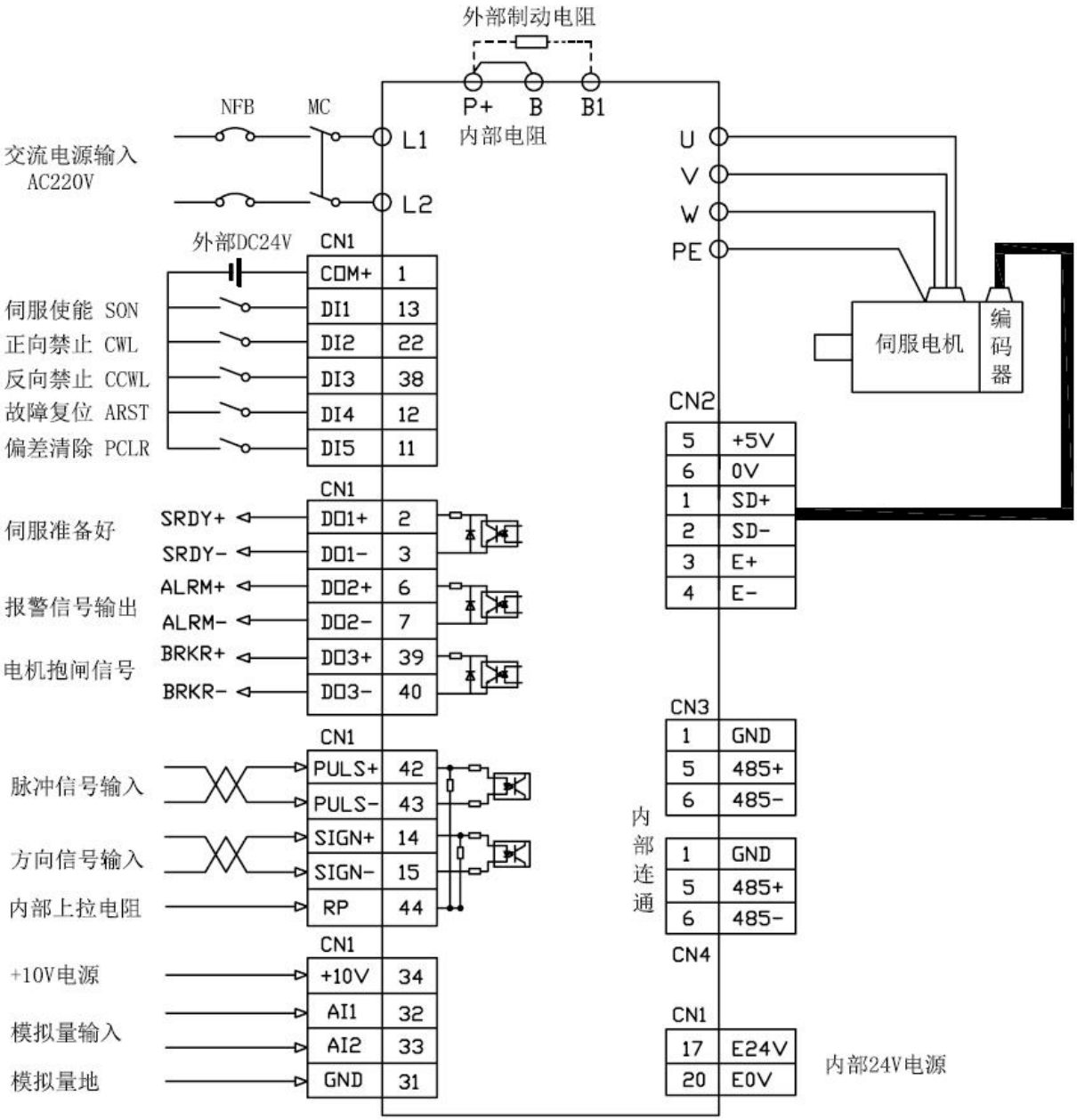


CN1 interface definition table

Sewer number	Pin definition	Symbol content	remarks
1	COM+	External power supply +24V	DI terminal power public end
13	SON	Servo enabled	DI input 1
22	SPD1	Speed selection one	DI input 2
38	SPD2	Speed selection two	DI input 3
12	ARST	Fault reset	DI input 4
11	PCLR	Bias removal	DI input 5
2	SRDY+	The servo is ready to signal	DO output 1
3	SRDY-		
6	ALRM+	Send a servo alarm output signal	DO output 2
7	ALRM-		

39	BRKR+	Motor brake signal	DO output 3
40	BRKR-		
42	PULSE	Instruction pulse input signal +	
43	/PULSE	Instruction pulse input signal-	
14	SIGN	Directional input signal +	
15	/SIGN	Directional input signal-	
44	RP	The internal pull-up resistor is connected to the entrance	Use 24V pulse
31	GND	Analog input location	
32	AI1	Analog input channel one	
33	AI2	Analog input channel two	
34	+10V	Internal +10V power supply	Use the potentiometer
17	E24V	Internal DC24V output, up to 100Ma;	It can only be used as a servo DI signal power supply and cannot carry other loads
20	E0V		

2.5.2 Definition of wiring for driving standard systems



explain：

1、The standard drive is powered by a single-phase AC220 power supply and can only be connected to the L1 and L2 terminals; (three-phase needs to be ordered when specified)

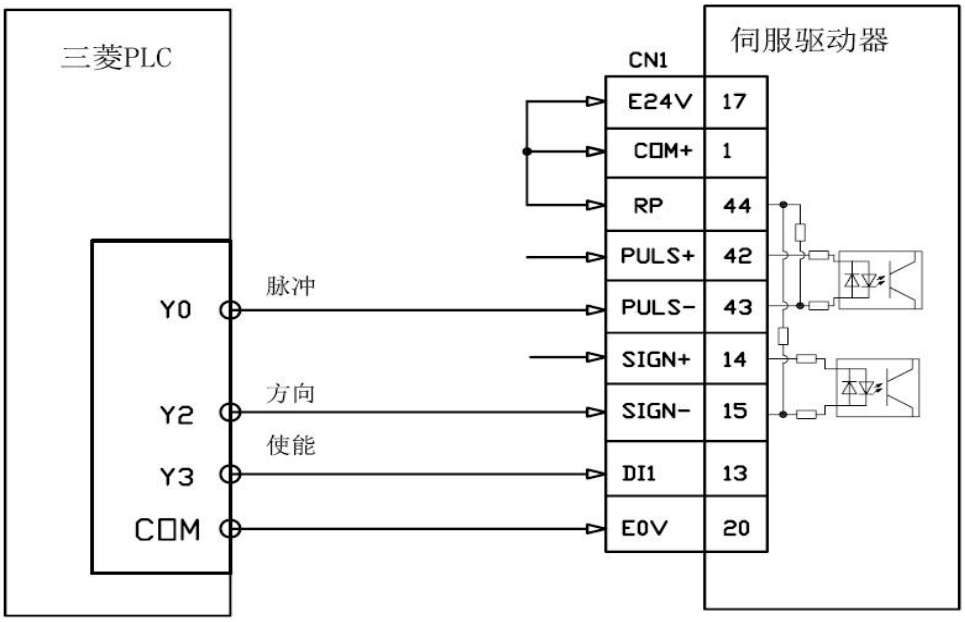
2、When using NPN type 24V pulse control, directly connect +24V to pin 44, and do not wire pin 42 and 14; and do not directly use +24V power supply to pin 42 and 14

3、The internal 24V power supply can only output 100mA power at most, and cannot carry loads such as relays and touch screens;

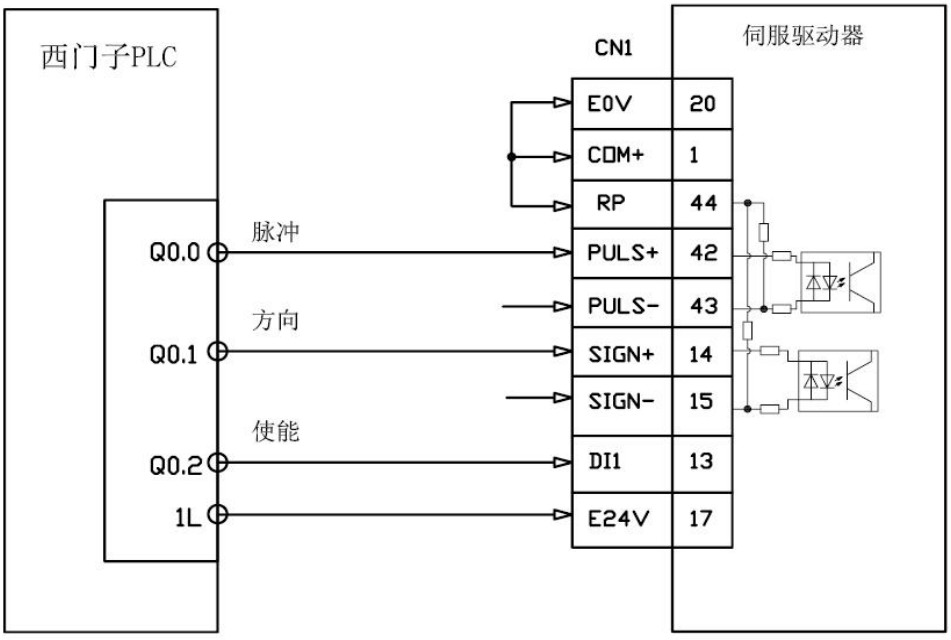
2.5.3 Control signal wiring example

(1) Open circuit pulse signal of the collector

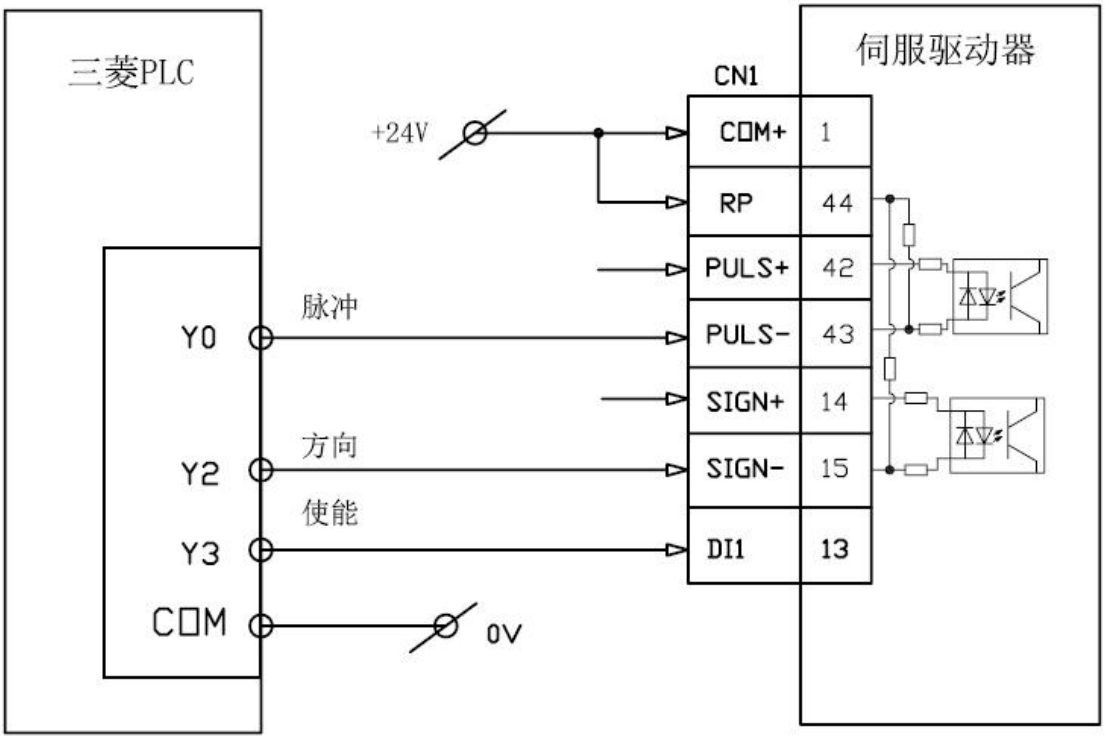
1.1 Use the internal 24V power supply of the servo, and NPN level common anode connection method; (recommended)



1.2 Use the internal 24V power supply of the servo, PNP level common cathode connection method; (recommended)

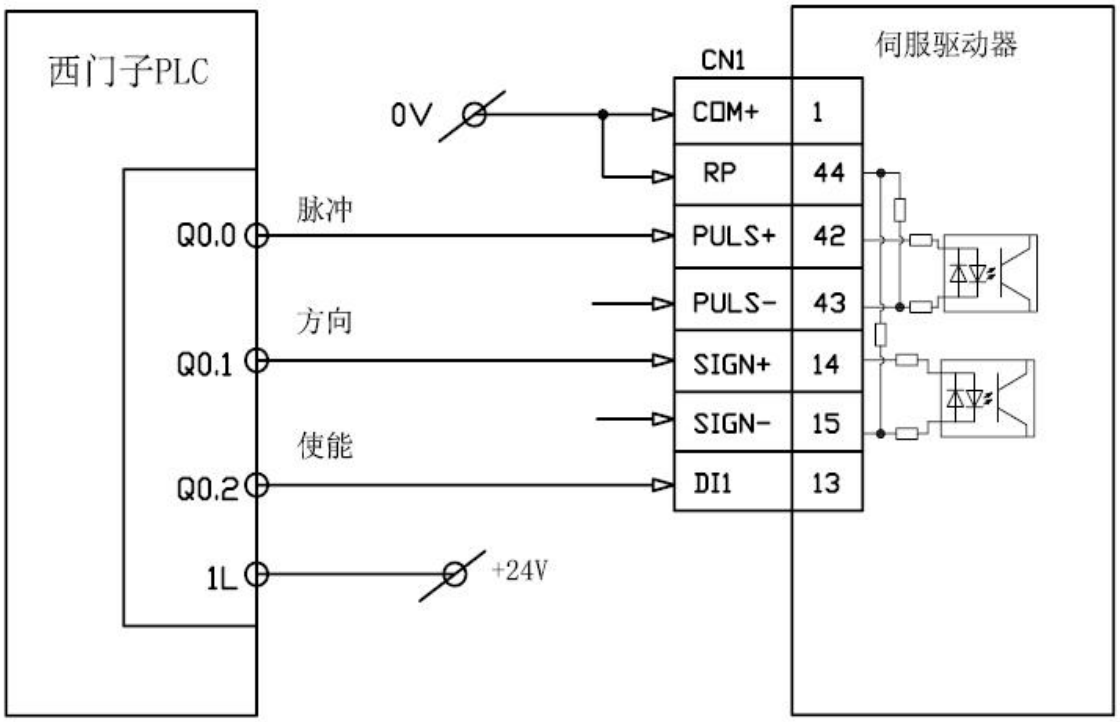


1.3 Use external 24V power supply, NPN level common cathode connection;

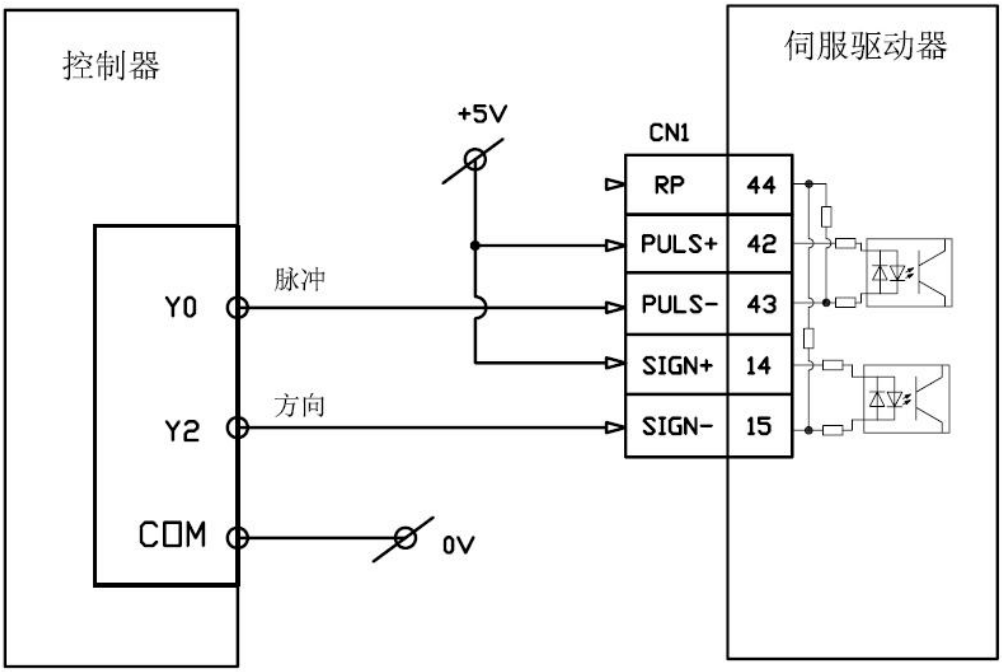


1.4 Use

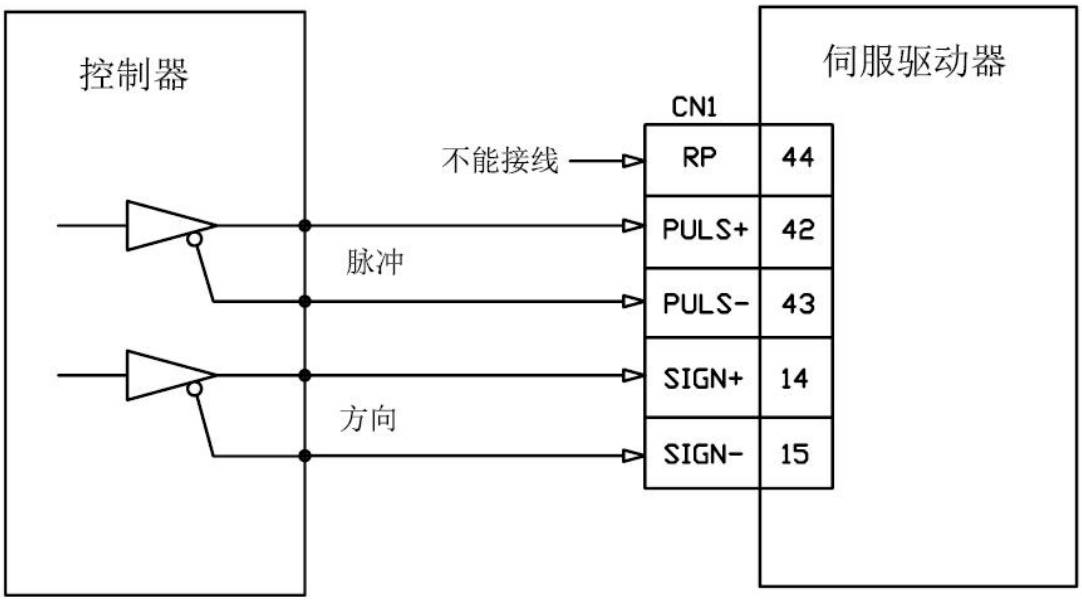
external 24V power supply, PNP level common cathode connection;



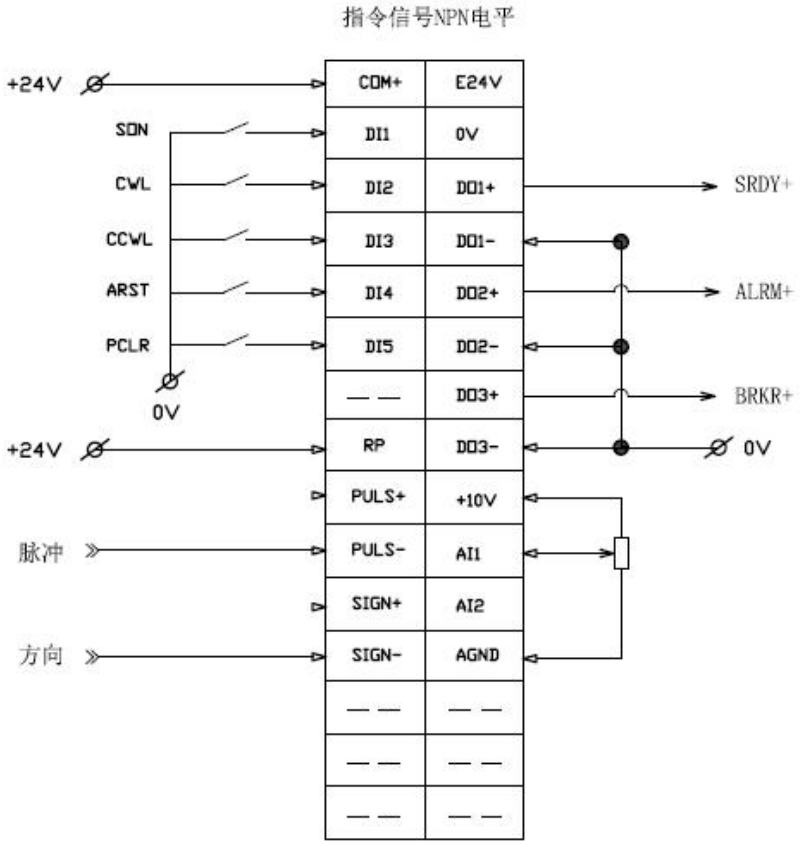
1.5 Use external 5V power supply, NPN level common cathode connection;

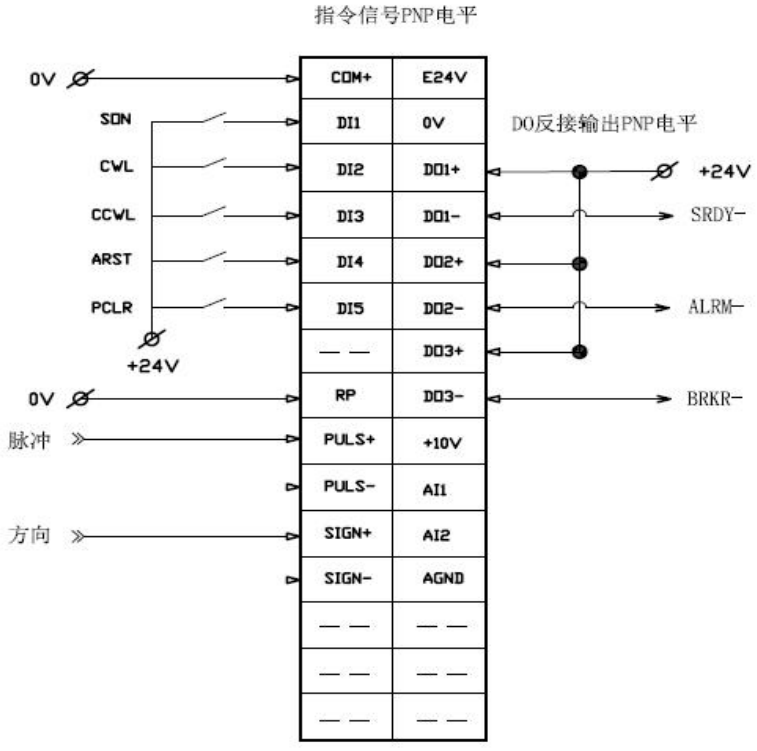


(2) Differential signal pulse

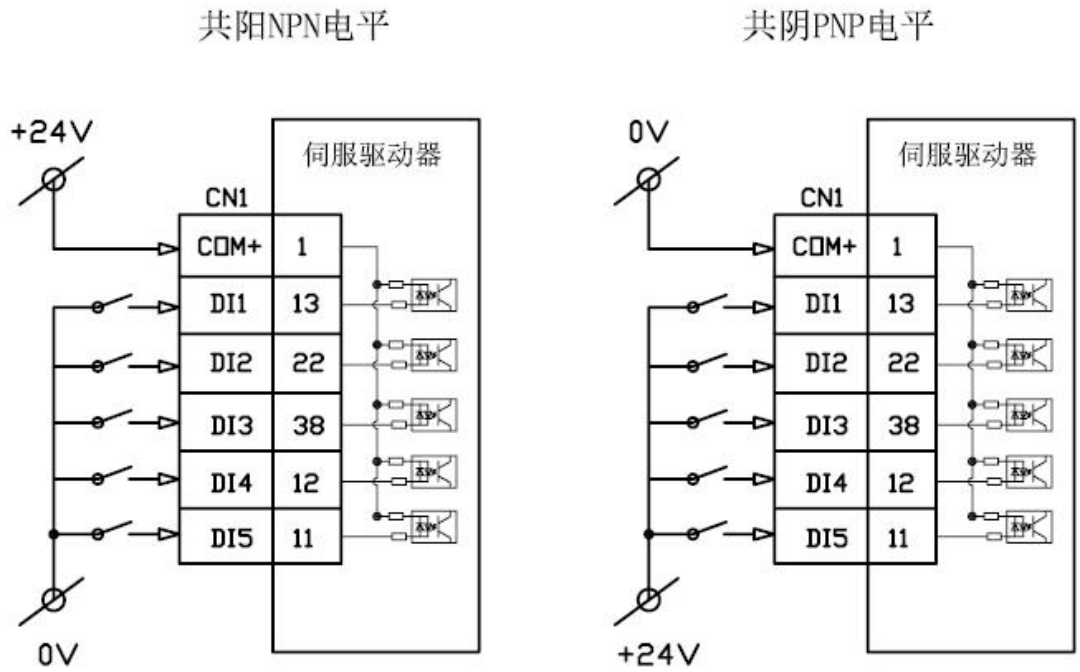


(3) PS702 wiring example

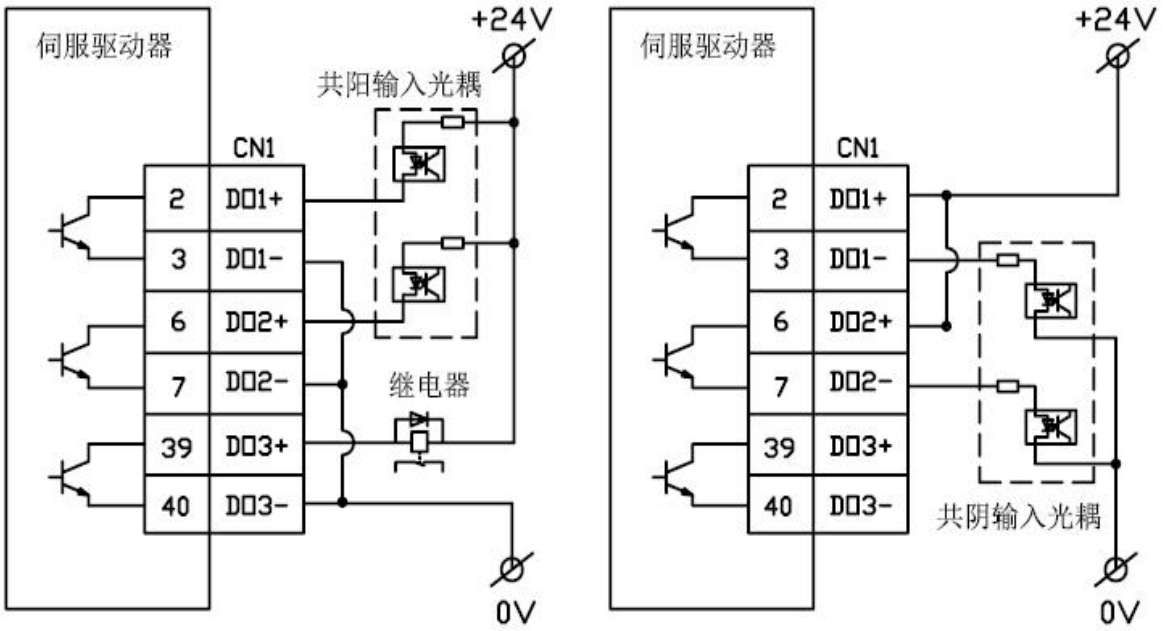




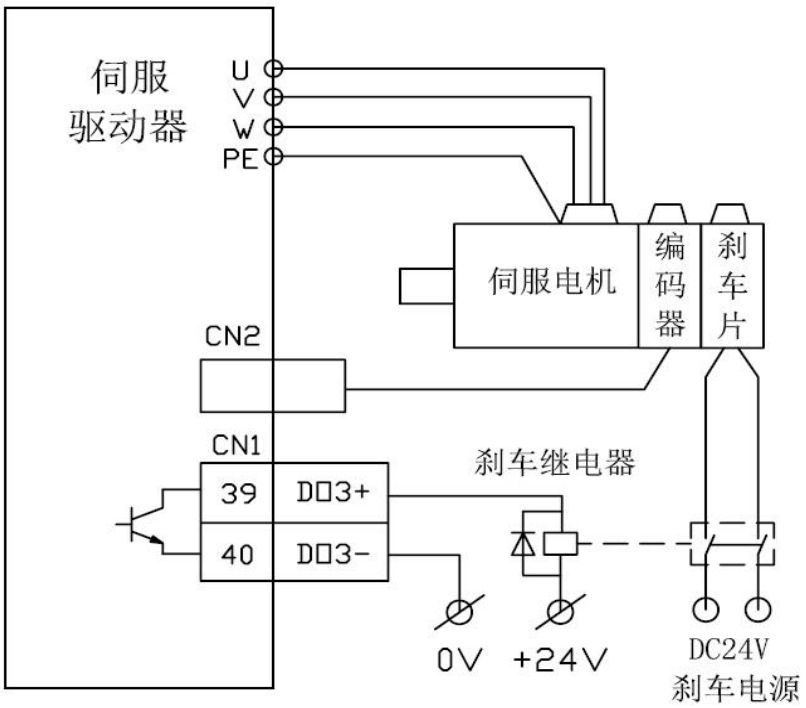
(4) DI input signal



(5) DO output signal



(6) Motor brake control signal

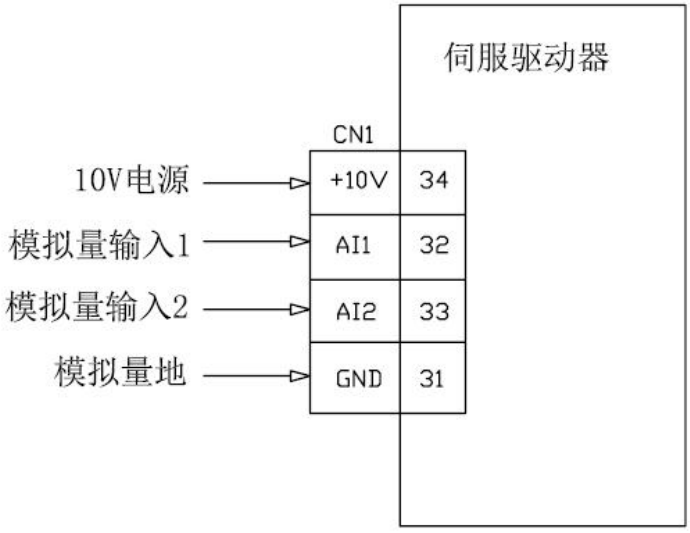


A. In the vertical load, it is necessary to select a motor with a brake. The brake control of the motor is best to use the brake output signal provided by the driver.

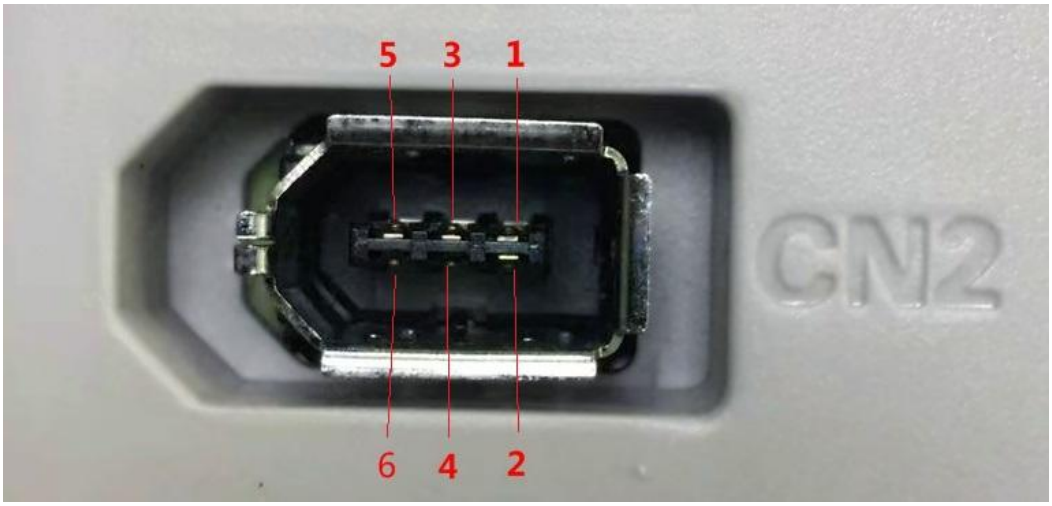
B. The DC24V power supply used by the brake coil shall be provided by an external switching power supply;

C. The DO output signal of the servo driver cannot directly control the brake coil, but must go through the intermediate relay;

(7) Analog input signal



2.6 The encoder interface is defined as CN2



Pin number	grade	function declaration	remarks
1	SD+	Encoder data communication is correct	The encoder communication line should use a twisted pair shielded wire, and the positive and negative of data communication should be on one twisted pair.
2	SD-	Encoder data communication is negative	
3	NC	continue to have	
4	NC	continue to have	
5	+5V	The encoder power supply is positive	When the encoder line length exceeds 20 meters, it is necessary to thicken the two power lines or use multiple power lines.
6	0V	Encoder power is negative	
	Plug metal housing	Ground the shield wire	The shield of the encoder wire should be connected to the metal shell

2.7 Communication port connection and description (CN3, CN4)

2.7.1 Definition table of CN3 and CN4 interfaces

CN3 (crystal head plane end from left to right)			CN4 (crystal head plane end from left to right)		
Pin number	Pin definition	Content description	Pin number	Pin definition	Content description
5	RS-485+	RS485 data signal +	5	RS-485+	RS485 data signal +
6	RS-485-	RS485 data signal-	6	RS-485-	RS485 data signal-
1	GND	Digital signal ground	1	GND	Digital signal ground

2.7.2 Communication instructions

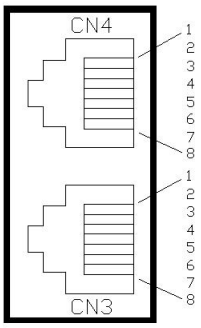
B baud rate : 38400Bps (default)

Data length: 8 bits

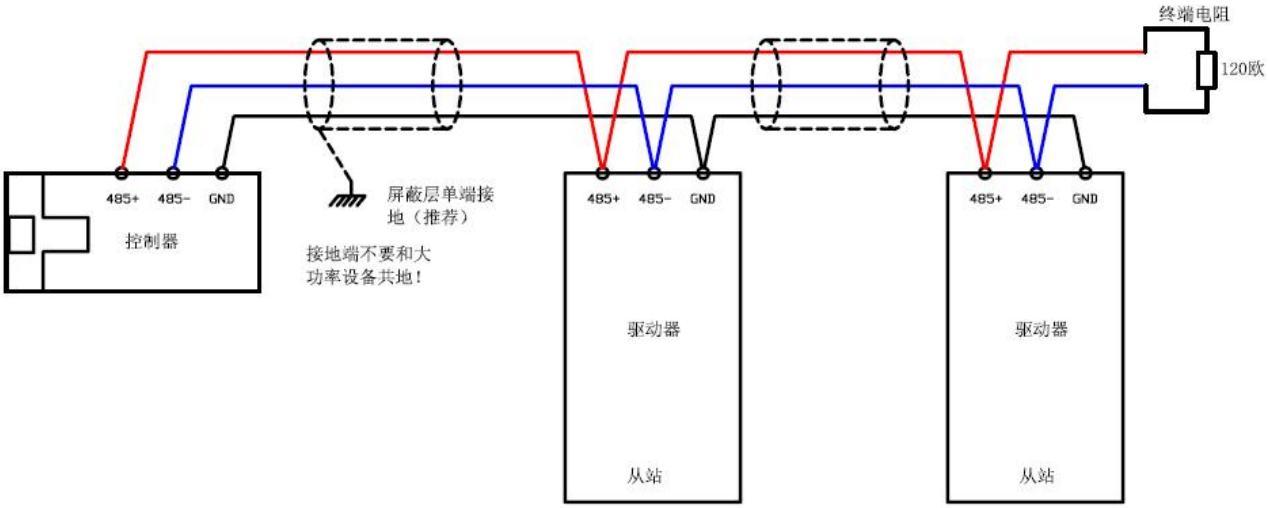
Stop bit: 1 bit

Check digit: None

Note: When communicating with multiple machines, please set the station number of the servo station correctly



2.7.3 Communication wiring instructions



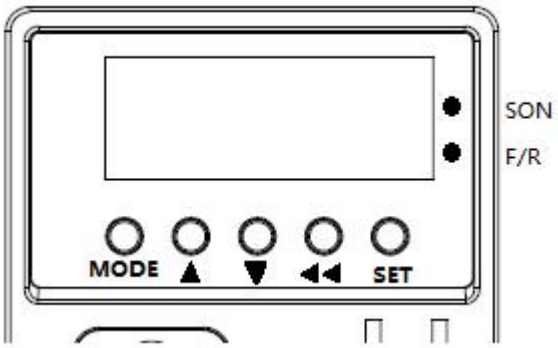
Chapter 3 Display and Operation

3.1 Key and display instructions

3.1.1 Key and display instructions

The panel of PS700 servo driver consists of a display (5-digit digital tube) and 5 keys. It can be used for various status data display and parameter setting of the servo driver.

name	function declaration
MODE	Enter parameter setting, mode switching, return to the previous level menu;
▲	The number of values increases or the options go up;
▼	Value decreases or option goes down;
◀◀	Numeric shift key
SET	Enter the parameter content and determine the set value;
SON	Servo enable indicator light;
F/R	the motor direction indicator;

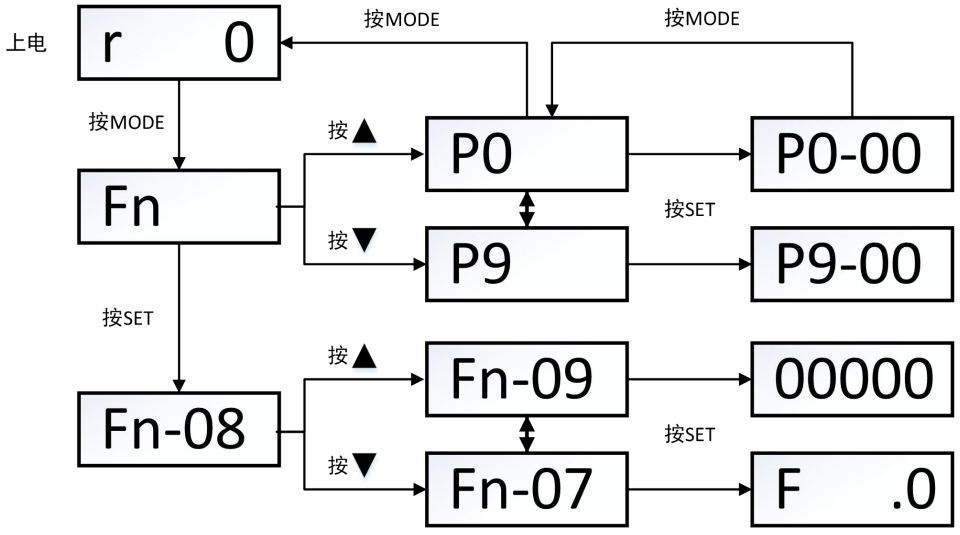


3.1.2 Display items:

During the servo operation, the display can be used for the status display, parameter display and fault display of the servo.

- Status display: drive running data, such as motor current and speed, bus voltage, pulse count, frequency, etc.;
- Parameter display: display all parameters and set values inside the drive;
- Fault display: When the servo system fails, the fault code is displayed for troubleshooting;

3.1.3 Panel operation process



direction for use:

（1）When the driver is powered on, the display directly displays the preset monitoring content value of P3-27; the default is the speed display of Fn-08;

（2）In the monitoring content mode, press the MODE key to enter the monitoring and parameter group;

（3）In the state of monitoring and parameter group, press ▲ key or ▼ key to switch the display of parameter groups, such as Fn, P0-P9;

（4）In the parameter group mode, press SET to enter the parameter content display, and press ▲ or ▼ to change the parameter value. When changing, you can press ▲▲ to shift the decimal point, which is more convenient to change multi-digit data.

（5）After the set value is changed, press the SET key to store the parameters or execute the command. The parameters will take effect immediately after saving. However, for parameter P1-04, long press the SET key for 3 seconds after setting to save the power off.

（6）Parameter P1-14 needs to be re-powered on to take effect.

3.2 Menu

3.2.1 Menu summary

Menu code	Summary of parameter groups
Fn group	Monitoring parameters
P0 group	Driver parameters
Group P1	Position control parameters
P2 group	Gain type parameters
P3 group	essential parameter
Group P4	Speed torque parameters
P5 group	Terminal input and output parameters
Group P6	Fault and protection parameters
Group P7	Multiple position and speed parameters
Group P8	parameter of electric machine
Group P9	Communication parameters
PA group	Tension control parameters

3.2.2 Parameter Settings

Parameter restored to factory value:

Restore default value: When the servo driver is delivered by the manufacturer, the corresponding motor parameters of each motor type are set in the servo driver. According to the Motor model code, the P1-05 parameter value is set, and P3-00 is set to 1, and the current parameter value is automatically restored to the default value.

relevant parameter	name	unit	Parameter range	default value	Applicable mode
P1-05	Motor model code		1~200	0	PST
P3-00	Execute the operation code		0~2	0	PST

Chapter IV Parameters

4.1 Control mode description

Control mode category	subclass	P1-00 set value	explain
P(position control)	Pt	0	External position pulse command control
	Pr	1	Internal location mode
	PtTt	10	External position pulse command control (with torque limit)
	PtTtc	16	External position pulse command control (with torque detection)
S（speed control）	St	2	Velocity position mode
	Si	3	Speed mode
T (torque control)	T	4	Torque control mode
mixed model	St-Pt	5	Switch between speed mode and external position mode
	St-Pr	6	Switch between speed mode and internal position mode
	St-Ti	7	Switch between speed mode and torque mode
	Pt-Ti	8	Switch between external position mode and torque mode
	Pt-Pr	9	Switch between external and internal position modes

test mode	Sr	11	Speed trial run
	JOG	12	JOG move
	OL	13	Speed test mode
	OP	15	Open loop operation (manufacturer use)
	A-TEST	17	Automatic forward and reverse test mode

4.1.1 Control mode definition table

The PS700 series has a variety of built-in control modes, which can be selected by setting the value of P1-00. The specific control modes are as follows:

<table>
<tr><th>P1-00</th><th>control model</th><th>pattern description</th></tr>
<tr><td>0</td><td>Control the Pt at the external position</td><td>External pulse instruction input (differential pulse frequency 500K, single end pulse frequency 200K)</td></tr>
<tr><td>1</td><td>Internal position control Pr</td><td>1) When the DI input MDP0 is 0, the internal position automatic control is executed,
When P7-00 is set to 0, the 8 segment incremental coordinate position control is performed, that is, the position angle selected in the following table is used as the position increment and then run at the given speed. The position action is triggered by terminal function PTRG.
<table>
<tr><th>Trigger command</th><th>Number of sections</th><th>POS3</th><th>POS2</th><th>POS1</th><th>Location Angle</th><th>Given velocity</th></tr>
<tr><td>1</td><td>one paragraph</td><td>0</td><td>0</td><td>0</td><td>P7-01 / P7-02</td><td>P7-03</td></tr>
<tr><td>1</td><td>Part two</td><td>0</td><td>0</td><td>1</td><td>P7-04/ P7-05</td><td>P7-06</td></tr>
<tr><td>1</td><td>three-section</td><td>0</td><td>1</td><td>0</td><td>P7-07 / P7-08</td><td>P7-09</td></tr>
<tr><td>1</td><td>Four paragraphs</td><td>0</td><td>1</td><td>1</td><td>P7-10 / P7-11</td><td>P7-12</td></tr>
<tr><td>1</td><td>Five paragraphs</td><td>1</td><td>0</td><td>0</td><td>P7-13 / P7-14</td><td>P7-15</td></tr>
<tr><td>1</td><td>Six paragraphs</td><td>1</td><td>0</td><td>1</td><td>P7-16 / P7-17</td><td>P7-18</td></tr>
<tr><td>1</td><td>seven-segment</td><td>1</td><td>1</td><td>0</td><td>P7-19 / P7-20</td><td>P7-21</td></tr>
<tr><td>1</td><td>Eight paragraphs</td><td>1</td><td>1</td><td>1</td><td>P7-22 / P7-23</td><td>P7-24</td></tr>
</table>
The position and Angle values of the motor are fixed to rotate one circle with 131,072 pulses. When using, the set displacement or Angle should be converted into the corresponding pulse number and written into the parameters of the corresponding section.</td></tr>
</table>

<table>
<tr>
<td></td>
<td></td>
<td>When P7-00 is set to 1, the 8 segment absolute coordinate position control is performed. That is, the position increment is calculated by selecting the position Angle when P7-00 is set to 0, and then running at the given speed of P7-03.

When P7-00 is set to 2, the absolute coordinate position control is performed. That is, the position at the end of positioning is taken as the reference origin, the position increment is calculated by the position Angle input through the serial port, and then the P7-03 is run at the given speed.

When enabled, when the terminal function PTRG (19) is 1, it triggers the operation at the selected speed and position. The trigger signal is valid on the rising edge.

2) When the DI input MDP0 is 1, the internal position manual control is executed and the selection speed is selected according to the table,
<table>
<tr><th>MD0</th><th>MD1</th><th>Given velocity</th></tr>
<tr><td>0</td><td>1</td><td>P4-19</td></tr>
<tr><td>1</td><td>0</td><td>P4-18</td></tr>
<tr><td>0</td><td>0</td><td>0</td></tr>
<tr><td>1</td><td>1</td><td>0</td></tr>
</table>
</td>
</tr>
<tr>
<td>2</td>
<td>Speed position control Si1 (with position loop)</td>
<td>When P4-00 = 0, select the given speed according to the table below; (P4-03 can be used as the torque limit value)
<table>
<tr><th>SPD1</th><th>SPD2</th><th>Given velocity</th></tr>
<tr><td>0</td><td>0</td><td>P4-18</td></tr>
<tr><td>1</td><td>0</td><td>P4-19</td></tr>
<tr><td>0</td><td>1</td><td>P4-20</td></tr>
<tr><td>1</td><td>1</td><td>P4-21</td></tr>
</table>
When P4-00 = 1, Ai1 is taken as the given speed, and the speed = Ai1 voltage * P5-11/10

When P4-00 = 2, Ai2 is taken as the given speed, and the speed = Ai2 voltage * P5-11/10

When P4-00 is equal to 3, the pulse is given as the speed = given frequency * P5-11/P5-13</td>
</tr>
<tr>
<td>3</td>
<td>Speed control (Si2)</td>
<td>The basic function setting is the same as mode 2, refer to the content of mode 2.

Mode 3 has the following two special features:

1. When P4-26=0, the motor runs in the same mode as mode 2; when P4-26 = 1, the motor runs in the direction controlled by REV and FWD terminals

2. When P4-00=4, the high precision speed is given by communication, 0.001 rev; refer to page P92 for communication address. Note:(mode 3 has higher steady speed accuracy than mode 2)</td>
</tr>
</table>

<table>
<tr>
<td>4</td>
<td>Internal Torque Mode (Ti)</td>
<td>When P4-08 = 0, the speed limit is set to P4-09
When P4-08 = 1, Ai1 is used as the speed limit, and the speed is Ai1 voltage * P5-11/10;
P4-08 = 2: take Ai2 as the speed limit, and the speed is Ai2 voltage * P5-11/10;
DI terminal function zero speed clamping DI_LOK=0, the speed is limited to zero;
When P4-10 is zero, the torque given value is calculated according to the table below:
<table>
<tr><th>DI_FIL</th><th>DI_RIL</th><th>Torque is given</th></tr>
<tr><td>0</td><td>0</td><td>Rated motor current * (P4-06/1000) * (P4-11/1000)</td></tr>
<tr><td>1</td><td>0</td><td>Rated motor current * (P4-06/1000) * (P4-12/1000)</td></tr>
<tr><td>0</td><td>1</td><td>Rated motor current * (P4-06/1000) * (P4-13/1000)</td></tr>
<tr><td>1</td><td>1</td><td>Rated motor current * (P4-06/1000) * (P4-11/1000)</td></tr>
</table>
When P4-10 is 1, the torque given is Ai1 input, and the calculation is as follows:
Rated motor current * (P4-06/1000) * (Ai1 voltage / 10)
When P4-10 is 2, the torque given is Ai2 input, and the calculation is as follows:
Rated motor current * (P4-06/1000) * (Ai2 voltage / 10)</td>
</tr>
<tr>
<td>5</td>
<td>Speed mode and external position switching mode</td>
<td>When P1-03 is set to 0: When MDC input is 0, select the given speed according to the table;
<table>
<tr><th>SPD3</th><th>SPD2</th><th>SPD1</th><th>Given velocity</th></tr>
<tr><td>0</td><td>0</td><td>1</td><td>P4-18</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>P4-19</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>P4-20</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>P4-21</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>P4-22</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>P4-23</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>P4-24</td></tr>
</table>
When MDC input is 1, switch to mode 0—— external position control</td>
</tr>
<tr>
<td>6</td>
<td>Switch between speed mode and internal position mode</td>
<td>When MDC input is 1, the Pr mode is executed (see mode 1 for details)
When MDC input is 0, Si1 mode is executed (see mode 2 for details)</td>
</tr>
<tr>
<td>7</td>
<td>Switch between speed and torque modes</td>
<td>When MDC input is 0, Si2 mode is executed, see mode 3 for details;
When MDC input is 1, Ti mode is executed. See mode 4 for details</td>
</tr>
</table>

<table>
<tr><td>8</td><td>Location control and torque control switch</td><td>When MDC input is 0, Pt mode is executed, see mode 0 for details;
When MDC input is 1, Ti mode is executed, see mode 4 for details;</td></tr>
<tr><td>9</td><td>External and internal position control switching mode (Pt_Pr)</td><td>When MDC input is 0, the Pt mode is executed (see mode 0 for details)
When MDC input is 1, the Pr mode is executed (see mode 1 for details)</td></tr>
<tr><td>10</td><td>External position pulse instruction control with torque limit (PtTt)</td><td>This mode is based on the external position control mode (Pt), but differs in that the motor output torque reaches the limit torque and only accepts reverse pulse commands.
P4-10=0, when both DI_FIL and DI_RIL inputs are 0:
The positive torque limit is: motor rated torque * (P4-06/1000) * (P4-11/1000)
Negative limit torque is: motor rated torque * (P4-06/1000) * (P4-12/1000)
For other states of DI_FIL and DI_RIL, the positive and negative torque limits are determined by P4-03.
P4-10=1, with AI1 input as the torque source, the positive and negative torque limits are calculated as follows: motor rated current * (P4-06/1000) * (AI1 voltage / 10)
P4-10=2, with AI2 input as the torque source, the positive and negative torque limits are calculated as follows: motor rated current * (P4-06/1000) * (AI2 voltage / 10)</td></tr>
<tr><td>11</td><td>Motor trial operation mode (Sr)</td><td>When P1-00=11, in the case of servo SON, the speed is set by P3-04; positive and negative numbers indicate the forward and reverse speeds.</td></tr>
<tr><td>12</td><td>Motor jogging operation (Jog)</td><td>See 5.2 JOG operation for details.
Set the Jog speed by P3-02;</td></tr>
<tr><td>13</td><td>Motor test run (OL)</td><td>When P1-00=13, in the case of servo SON, the speed is set by P3-03; positive and negative numbers indicate the forward and reverse speeds.</td></tr>
<tr><td>14/15</td><td></td><td>Used by the manufacturer</td></tr>
<tr><td>16</td><td>External position control with torque detection (PtTtc)
[V39 version starts this mode and the function of mode 0 is consistent, and the torque detection function is valid in all modes]</td><td>Select the torque detection value according to the table below
<table>
<tr><th>DI_FIL</th><th>DI_RIL</th><th>Torque reaches the judgment threshold</th></tr>
<tr><td>0</td><td>0</td><td>Rated motor current * (P4-06/1000) * (P4-11/1000)</td></tr>
<tr><td>1</td><td>0</td><td>Rated motor current * (P4-06/1000) * (P4-12/1000)</td></tr>
<tr><td>0</td><td>1</td><td>Rated motor current * (P4-06/1000) * (P4-13/1000)</td></tr>
<tr><td>1</td><td>1</td><td>Rated motor current * (P4-06/1000) * (P4-11/1000)</td></tr>
</table>
When the set torque detection value is reached, the servo outputs a torque detection arrival signal function TCHK; in this mode, no torque limit is performed, and the torque output is at the maximum output, and other modes are the same as mode 0.</td></tr>
</table>

17	Automated Testing (A-TEST)	P3-07 is the target speed, P3-08 is the zero speed running time, and P3-09 is the forward and reverse running time

4.2 Monitoring status

Fn monitoring parameter group:

The top menu	function declaration	second-level menu	Content description	postal address (16-bit)
Fn-00	continue to have			1000h
Fn-01	Current position 1 low 16 bits	**03910**	Current position 200518 pulse	1001h
Fn-02	Current position 1 high 16 bits	**00003**		1002h
Fn-03	Position instruction is 16 bits lower	**19101**	Position command 19101 pulse	1003h
Fn-04	The position instruction is 16 bits high	**00000**		1004h
Fn-05	Current position 2 is 16 bits lower	**15298**	Current position 15298 pulses (via electronic gear ratio)	1005h
Fn-06	The current position is 2 high 16 bits	**00000**		1006h
Fn-07	Position command pulse frequency (kHz)	**F 12.6**	Position command pulse frequency 12.6kHz	1007h
Fn-08	Motor speed (r/min)	**R 1000**	Motor speed 1000r/min	1008h
Fn－09	The position deviation is 4 bits lower	**E 40**	The position deviation is 40 pulses	1009h
Fn-10	High position deviation of 4 bits (10,000 pulses)	**E. 0**		100Ah
Fn-11	busbar voltage	**U. 315**	Bus voltage 315V	100Bh
Fn-12	average current (A)	**I 2.3**	The average current is 2.3A	100Ch
Fn-13	The encoder position is 16 bits lower per circle	**1072**	Repeat the value within a single circle of the encoder	100Dh
Fn-14	The encoder position is 16 bits high per circle	**13**		100Eh
Fn-15	The encoder has 16 bits for multi-turn values	**A 3265**	The encoder has 3265 turns	100Fh
Fn-16				1010h
Fn-17	Input status terminal	**In 1111**	input terminal	1011h
Fn-18	Output terminal status	**Out 11**	leading-out terminal	1012h
Fn-19	load factor	**E.**	The ratio of actual current to rated motor current *100	1013h

Fn-20	Servo running status	**Rdy**	Ready, communication read as 0	1014h
		Run	Running, communication reads as 1	
		Err	Fault, communication read as 2	
Fn-21	Alarm code	**ALE 4**	Call 911	1015h
Fn-22	The cumulative number of encoder communication errors	**U 0.000**	The cumulative time is P	1016h
Fn-23	Encoder status bit			1017h
Fn-24	continue to have			1018h
Fn-25	continue to have			1019h
Fn-26	The coordinate origin is set 16 bits lower		Encoder unit	101Ah
Fn-27	The coordinate origin is set to 16 bits high			101Bh
Fn-28	The position of each motor coil is 16 bits lower than the position of the pulse instruction		Positioning instruction unit (the value of the number of multi-turn position pulses of the motor divided by the electronic gear ratio)	101Ch
Fn-29	The position of each motor coil corresponds to the position of the pulse instruction 16 bits higher			101Dh
Fn-30	The U phase current is zero biased		V	101Eh
Fn-31	The V phase current is zero biased		V	101Fh
Fn-32	continue to have			1020h
Fn-33	AI1 corrects the voltage		Unit 0.001V	1021h
Fn-34	AI2 corrects the voltage		Unit 0.001V	1022h
Fn-35	AI1 corrects the pre-voltage		Unit 0.001V	1023h
Fn-36	AI2 corrects the pre-voltage		Unit 0.001V	1024h
Fn-37	AI1 Settings			1025h
Fn-38	AI2 Settings			1026h
Fn-39	Set the DI input level of the communication		See section 7.4	1027h
Fn-40	The communication reads the DO output level		See section 7.4	1028h
Fn-41	Correct the frame count for communication			1029h
Fn-42	Count the number of communication error frames			102Ah

Fn-43	Drive temperature		Supported by some models	102Bh
Fn-44	Tension output value		Version V17 and above	102Ch
Fn-45	AI speed setting value			102Dh
Fn-46	AI torque setting value			102Eh
Fn-47	Input voltage display	**V**	Displays the AC power supply voltage value	102Fh
Fn-48	Encoder single circle position Angle (long press SET to save to P5-32)		Unit 0.1°	1030h
Fn-49	Motor speed (0.1 RPM)		The communication reads the low 16 bits	1031h
Fn-50			The communication reads the high 16 bits	1032h
Fn-51	situation display		20# DI function is cleared	1033h
Fn-52	counter		32# DI function is cleared	1034h
Fn-53	Current coil diameter is displayed	mm	Tension mode, 0.1mm	1035h

4.3 Overview of PS700 series parameter table

The first character after the parameter starting code P is the group character, and the next two characters are the parameter character. The communication address is composed of the group character *256+ parameter character value respectively. The definition of the parameter group is as follows:

4.3.1 P0 group —— driver parameters

parameter	Function code description	pattern	Set the scope	Factory value	unit	Communication address (hexadecimal)
P0-00	Software version 1	P S T	0~100	0	/	0000h
P0-01	Software version 2	P S T	0~100	0	/	0001h
P0-02	Hardware version	P S T	0~32767	0	/	0002h
P0-03	Second chip software version		0~32767	0	/	0003h
P0-04	continue to have		0~32767	0	/	0004h
P0-05	Manufacturer password		0~32767	0	/	0005h

parameter	Function code description	pattern	Set the scope	Factory value	unit	Communication address (hexadecimal)
P0-06	type		0~10008	5	/	0006h
P0-07	rated voltage		0~381	Depending on the model	V	0007h
P0-08	power rating		0~750	Depending on the model	10W	0008h
P0-09	rated current		0~3000	Depending on the model	0.01A	0009h
P0-10	maximum current		0~7000	Depending on the model	0.01A	000Ah
P0-11	Temperature curve selection		0: no temperature protection; 1:...,	Depending on the model	/	000Bh
P0-12	UV current sampling gain deviation		500~1500	Depending on the model	/	000Ch
P0-13	Current correction factor		500~1500	Depending on the model	/	000Dh
P0-14	Voltage correction factor		500~1500	Depending on the model	/	000Eh
P0-15	Overvoltage point setting		250~850	Depending on the model	V	000Fh
P0-16	Release point		250~850	Depending on the model	V	0010h

parameter	Function code description	pattern	Set the scope	Factory value	unit	Communication address (hexadecimal)
P0-17	Under-voltage point setting		150~500	Depending on the model	V	0011h
P0-18	carrier frequency		20~80	Depending on the model	100Hz	0012h
P0-19	Default motor model		0~500	Depending on the model	/	0013h
P0-20	Speed ring scheduling frequency coefficient		0~8	Depending on the model	/	0014h
P0-21	Location ring scheduling frequency coefficient		0~8	Depending on the model	/	0015h
P0-22	AI1 measures voltage (corrected)	PST	0~5000	2000	0.001V	0016h
P0-23	AI1 sampling voltage (before correction)	PST	0~5000	2000	0.001V	0017h
P0-24	AI1 measures voltage (corrected)	PST	5000~10000	8000	0.001V	0018h
P0-25	AI1 sampling voltage (before correction)	PST	5000~10000	8000	0.001V	0019h
P0-26	AI2 measures voltage (corrected)	PST	0~5000	2000	0.001V	001Ah
P0-27	AI2 sampling voltage (before correction)	PST	0~5000	2000	0.001V	001Bh

parameter	Function code description	pattern	Set the scope	Factory value	unit	Communication address (hexadecimal)
P0-28	AI2 measures voltage (corrected)	PST	5000~10000	8000	0.001V	001Ch
P0-29	AI2 sampling voltage (before correction)	PST	5000~10000	8000	0.001V	001Dh

4.3.2 P1 group —— Position control parameters

parameter	Function code description	pattern	Set the scope	Factory value	unit	Communication address (hexadecimal)
P1-00	Control mode selection (refer to Table 4.1.1 for details) [For detailed settings, see pages P41-43] 0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with position loop); 3: Speed mode (higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, set speed P3-04; 12: Jog mode, set speed P3-02; 13: Test mode, set speed P3-03; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3; Control mode selection (refer to Table 4.1 for details 1) [See pages P41 to 43 for setting instructions]	P S T	0~100	0	/	0100h

	0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with position loop); 3: Speed mode (higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, P3-04 set speed; 12: Jog mode, P3-02 set speed; 13: Test mode, P3-03 set speed; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3; Control mode selection (see Table 4.1 for details 1) [See pages P41 to 43 for setting instructions] 0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with position loop); 3: Speed mode (higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, P3-04 set speed; 12: Jog mode, P3-02 set speed; 13: Test mode, P3-03 set speed; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function;					

	17: Manufacturer mode 3; Control mode selection (see Table 4.1 for details 1) [See pages P41 to 43 for setting instructions] 0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with position loop); 3: Speed mode (higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, P3-04 set speed; 12: Jog mode, P3-02 set speed; 13: Test mode, P3-03 set speed; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3; Control mode selection (see Table 4.1 for details 1) [See pages P41 to 43 for setting instructions] 0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with position loop); 3: Speed mode (higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, P3-04 set speed; 12: Jog mode, P3-02 set speed;					

	13: Test mode, P3-03 set speed; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3; Control mode selection (refer to Table 4.1 for details 1) [See pages P41 to 43 for setting instructions] 0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with position loop); 3: Speed mode (higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, P3-04 set speed; 12: Jog mode, P3-02 set speed; 13: Test mode, P3-03 set speed; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3; Control mode selection (refer to Table 4.1.1 for details) [For detailed settings, see pages 41-43] 0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with position loop); 3: Speed mode (for higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function;					

	11: Speed trial operation, set speed P3-04; 12: Jog mode, set speed P3-02; 13: Test mode, set speed P3-03; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3; Control mode selection (see Table 4.1 for details 1) [See pages P41-43 for setting instructions] 0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with position loop); 3: Speed mode (higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, P3-04 set speed; 12: Jog mode, P3-02 set speed; 13: Test mode, P3-03 set speed; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3; Control mode selection (refer to Table 4.1 for details 1) [See pages P41 to 43 for setting instructions] 0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with position loop); 3: Speed mode (higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, P3-04 set speed; 12: Jog mode, P3-02 set speed; 13: Test mode, P3-03 set speed; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3; Control mode selection (see Table 4.1 for details 1) [See pages P41 to 43 for setting instructions] 0: Position mode, with external pulse input; 1: Internal					

	position control; 2: Speed and position mode (with position loop); 3: Speed mode (higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, P3-04 set speed; 12: Jog mode, P3-02 set speed; 13: Test mode, P3-03 set speed; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3; Control mode selection (refer to Table 4.1.1 for details) [For detailed settings, see pages P41-43] 0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with position loop); 3: Speed mode (higher stability); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, set speed P3-04; 12: Jog mode, set speed P3-02; 13: Test mode, set speed P3-03; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3; Control mode selection (refer to Table 4.1.1 for details) [For detailed settings, see pages 41-43] 0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with					

	position loop); 3: Speed mode (higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, set speed P3-04; 12: Jog mode, set speed P3-02; 13: Test mode, set speed P3-03; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3; Control mode selection (refer to Table 4.1.1 for details) [For detailed settings, see pages P41-43] 0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with position loop); 3: Speed mode (higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, set speed P3-04; 12: Jog mode, set speed P3-02; 13: Test mode, set speed P3-03; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3; Control mode selection (refer to Table 4.1.1 for details) [For detailed settings, see pages P41-43] 0: Position mode, with external pulse input;					

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	0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with position loop); 3: Speed mode (higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, P3-04 set speed; 12: Jog mode, P3-02 set speed; 13: Test mode, P3-03 set speed; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3; Control mode selection (see Table 4.1 for details 1) [See pages P41 to 43 for setting instructions] 0: Position mode, with external pulse input; 1: Internal position control; 2: Speed and position mode (with position loop); 3: Speed mode (higher stability and precision); 4: Torque mode; 5: Switch between internal speed and mode 0; 6: Switch between mode 1 and mode 2; 7: Switch between mode 3 and mode 4; 8: Switch between position control (mode 0) and torque control (mode 4); 9: Switch between external position control (mode 0) and internal position control (mode 1); 10: Position mode with torque limit function; 11: Speed trial operation, P3-04 set speed; 12: Jog mode, P3-02 set speed; 13: Test mode, P3-03 set speed; 14: Manufacturer mode 1; 15: Manufacturer mode 2; 16: Position mode with torque detection function;					

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	15: Manufacturer mode 2; 16: Position mode with torque detection function; 17: Manufacturer mode 3;					
P1-01	Direction of pulse or speed instruction 0: the direction of instruction pulse is logically positive; 1: the direction of instruction pulse is logically negative; Direction of pulse or speed instruction 0: the direction of instruction pulse is logically positive; 1: the direction of instruction pulse is logically negative; Direction of pulse or speed instruction 0: the direction of instruction pulse is logically positive; 1: the direction of instruction pulse is logically negative;	PS	0~1	0	/	0101h
P1-02	The external pulse column instruction input form is set as follows: 0: pulse + direction; 4: CCW/CW pulse (not supported yet); 6: AB phase pulse (not supported yet) The external pulse column instruction input form is set as follows: 0: pulse + direction; 4: CCW/CW pulse (not supported yet); 6: AB phase pulse (not supported yet) The external pulse column instruction input form is set as follows: 0: pulse + direction; 4: CCW/CW pulse (not supported yet); 6: AB phase pulse (not supported yet)	P	0~8	0	/	0102h
P1-03	continue to have	P S T	0~2	0	/	0103h
P1-04	Internal servo start setting 0: servo stop; 1: servo enable; Internal servo start setting 0: servo stop; 1: servo enable; Internal servo start setting 0: servo stop; 1: servo enable; After the parameter is set, you need to hold down the "SET" key for about 3 seconds. When the display shows "SAVE", it indicates that the parameter value is saved; otherwise, the modified value is not saved.	P S T	0~1	0	/	0104h
P1-05	Motor model code: When P3-00=1, the servo automatically restores the factory value of parameters according to the Motor model code	P S T	0~200	2	/	0105h
P1-06	First set of electronic gear ratio molecules (N1)	P	1~32767	16384	/	0106h

<table>
<tr><td>P1-07</td><td>Second set of electronic gear ratio molecules (N2)</td><td>P</td><td>1~32767</td><td>8192</td><td>/</td><td>0107h</td></tr>
<tr><td>P1-08</td><td>Third group of electronic gear ratio molecules (N3)</td><td>P</td><td>1~32767</td><td>4096</td><td>/</td><td>0108h</td></tr>
<tr><td>P1-09</td><td>Fourth group of electronic gear ratio molecules (N4)</td><td>P</td><td>1~32767</td><td>2048</td><td>/</td><td>0109h</td></tr>
<tr><td>P1-10</td><td>The denominator (M1) of the first set of electronic gears When P1-11 is zero, select the electronic gear ratio according to the table below: The denominator (M1) of the first set of electronic gears When P1-11 is zero, select the electronic gear ratio according to the table below:
<table>
<tr><td>Select groups</td><td>GN2</td><td>GN1</td><td>Electronic gear ratio</td></tr>
<tr><td>a set</td><td>0</td><td>0</td><td>P1-06 / P1-10</td></tr>
<tr><td>Two groups</td><td>0</td><td>1</td><td>P1-07 / P1-15</td></tr>
<tr><td>trio</td><td>1</td><td>0</td><td>P1-08 / P1-16</td></tr>
<tr><td>quadruplet</td><td>1</td><td>1</td><td>P1-09 / P1-22</td></tr>
</table></td><td>P</td><td>1~32767</td><td>1250</td><td>/</td><td>010Ah</td></tr>
<tr><td>P1-11</td><td>Number of pulses per revolution of the motor; (valid when not zero) Note: it is recommended that it should not be less than 300;</td><td>P</td><td>1~32767</td><td>10000</td><td></td><td>010Bh</td></tr>
<tr><td>P1-12</td><td>Position command smoothing function enabled 0: invalid 1: position command smoothing function enabled
Position command smoothing function enabled 0: invalid 1: position command smoothing function turned on
Position command smoothing function enabled 0: invalid 1: position command smoothing function turned on</td><td>P</td><td>0~2</td><td>0</td><td>/</td><td>010Ch</td></tr>
</table>

<table>
<tr><td>P1-13</td><td>Location command smoothing filter coefficients
(The smaller the value, the greater the effect, with lag)</td><td>P</td><td>1~10000</td><td>200</td><td>/</td><td>010Dh</td></tr>
<tr><td>P1-14</td><td>External pulse input filtering: (reboot after power failure)<table><tr><th>Pulse highest frequency</th><th>Recommended value</th></tr><tr><td>Under 100K</td><td>7</td></tr><tr><td>100K~200K</td><td>4</td></tr><tr><td>200K~500K</td><td>1</td></tr><tr><td>More than 1 meter</td><td>0</td></tr></table></td><td>P</td><td>0~12</td><td>4</td><td>/</td><td>010Eh</td></tr>
<tr><td>P1-15</td><td>Second set of electronic gear ratio denominator (M2)</td><td>P</td><td>1~32767</td><td>1250</td><td>/</td><td>010Fh</td></tr>
<tr><td>P1-16</td><td>Third group of electronic gear ratios denominator (M3)</td><td>P</td><td>1~32767</td><td>1250</td><td>/</td><td>0110h</td></tr>
<tr><td>P1-17</td><td>Pulse output source (retained)</td><td>P</td><td></td><td></td><td>/</td><td>0111h</td></tr>
<tr><td>P1-18</td><td>Direction of pulse output (retained)</td><td>P</td><td></td><td></td><td>/</td><td>0112h</td></tr>
<tr><td>P1-19</td><td>Direction of encoder pulse output (reserved)</td><td>P</td><td></td><td></td><td>/</td><td>0113h</td></tr>
<tr><td>P1-20</td><td>The encoder has a high number of frequency division pulses (retained)</td><td>P</td><td></td><td></td><td>/</td><td>0114h</td></tr>
<tr><td>P1-21</td><td>The number of frequency division pulses of the encoder is low (retained)</td><td>P</td><td></td><td></td><td>/</td><td>0115h</td></tr>
<tr><td>P1-22</td><td>Fourth group of electronic gear fractions (M4)</td><td>P</td><td>1~32767</td><td>1250</td><td>/</td><td>0116h</td></tr>
<tr><td>P1-23</td><td>ALE04 position out of tolerance switch 0: position out of tolerance judgment is valid; 1: shielded position out of tolerance; ALE04 position out of tolerance switch 0: position out of tolerance judgment is valid; 1: shielded position out of tolerance;
ALE04 position out of tolerance switch 0: position out of tolerance judgment is valid; 1: shielded position out of tolerance;</td><td>P</td><td>0~1</td><td>0</td><td>/</td><td>0117h</td></tr>
<tr><td>P1-24</td><td>Set the judgment threshold for positioning</td><td>P</td><td>0~10000</td><td>1000</td><td>Pulse</td><td>0118h</td></tr>
<tr><td>P1-25</td><td>The position determines the delay time of the output signal</td><td>S</td><td>0~30000</td><td>0</td><td>0.1ms</td><td>0119h</td></tr>
<tr><td>P1-26</td><td>Location out of tolerance detection range</td><td>P</td><td>0~2000</td><td>1000</td><td>3.6 degrees</td><td>011Ah</td></tr>
</table>

P1-27	P1-00=10, after the torque reaches 0: no pulse is received; 1: pulse is received; P1-00=10, after torque reaches 0: no pulse is received; 1: pulse is received; P1-00=10, after torque reaches 0: no pulse is received; 1: pulse is received;	P	0~1	0	/	011Bh
P1-28	Preserve 5	P				011Ch
P1-29	Return to zero mode 0: multi-turn absolute return to zero;	P	0~2	0	/	011Dh
P1-30	Return to zero operation: 0: not allowed; 1: allowed; 2: origin setting; Return to zero operation: 0: not allowed; 1: allowed; 2: origin setting;	P	0~1	0	/	011Eh
P1-31	Return to zero speed	P	+/-6000	500	Rpm	011Fh
P1-32	The zero point arrival position is judged to be the threshold	P	0~10000	10	Pulse	0120h
P1-33	The zero point is the delay time of the output signal	P	0~30000	50	0.1ms	0121h
P1-34	Zero Point Search Express (retained)	P			/	0122h
P1-35	Zero point search low speed (retained)	P			/	0123h
P1-36	Return to zero start-up hold time	P	0~10000	50	0.1ms	0124h
P1-37	Remainder 7	P				0125h
P1-38	Retain 8	P				0126h
P1-39	The coded Z signal reaches the judgment threshold (retained)	P	0~32766	30	/	0127h
P1-40	The zero point is 16 bits lower (reserved)					0128h
P1-41	The zero point position is 16 bits high (reserved)					0129h

4.3.3 P2 group —— gain parameters

parameter	name	pattern	Parameter range	Factory value	unit	Communication address (hexadecimal)
P2-00	Speed ratio gain; When the speed control gain is increased, the performance of speed response can be improved; but if the setting is too large, it is easy to produce vibration and noise Speed ratio gain; When the speed control gain is increased, the performance of speed response can be improved;	P S T	0~1280	30	0.1	0200h

	but if it is set too large, it is easy to produce vibration and noise					
P2-01	Speed integral time constant. The smaller the value, the better the speed response and the smaller the speed control error, but if set too large, it is easy to produce vibration and noise Speed integral time constant. The smaller the value, the better the speed response and the smaller the speed control error, but if set too large, it is easy to produce vibration and noise	P S T	1~32767	150	0.1ms	0201h
P2-02	Positional ratio gain	P S	0~2000	300	0.01	0202h
P2-03	Motor load inertia ratio (retained)	P S T	0~1000	100	/	0203h
P2-04	Position control feedforward gain	P	0~100	0	0.1	0204h
P2-05	Location gain variation rate (retained)	P	0~500	100	/	0205h
P2-06	Leave 0				/	0206h
P2-07	Keep 1				/	0207h
P2-08	Switch the speed gain at low speeds	P S T	0~6000	100	rpm	0208h
P2-09	Speed gain switching coefficient	P S T	0~500	100	+	0209h
P2-10	Velocity integral time constant 2	P S	0~32767	600	0.1ms	020Ah
P2-11	Speed ring integral separation judgment value (valid when P2-19 is 1)		0~6000	100	/	020Bh
P2-12	Speed integral separation takes the minimum time	P S T	0~32767	10	/	020Ch
P2-13	Speed loop PI saturation coefficient	PST	/	/	/	020Dh
P2-14	Cut-off frequency of the feedforward command low-pass filter	P	1~2000	300	Hz	020Eh
P2-15	Keep 2					020Fh
P2-16	Keep 3					0210h
P2-17	Speed integral separation point (retained)	P S	0~100	0	/	0211h
P2-18	Rate of change of speed control gain (retained)	P S T	0~100	0	/	0212h
P2-19	Speed integral separation judgment basis 0: speed error 1: Position error 2: Feedback torque current	S	0~2	0	/	0213h
P2-20	Speed P and PI regulator selection: 0: PI regulator; conventional regulator, with a certain overshoot when the load inertia ratio is large. 1: P regulator; when the load inertia is large, P regulator can be used to reduce overshoot Speed P and PI regulator selection: 0: PI regulator; conventional regulator, with a certain overshoot when the load inertia ratio is	P S	0~1	0	/	0214h

	large. 1: P regulator; when the load inertia ratio is large, P regulator can be used to reduce overshoot Speed P and PI regulator selection: 0: PI regulator; conventional regulator, with a certain overshoot when the load inertia ratio is large. 1: P regulator; when the load inertia is large, P regulator can be used to reduce overshoot					
P2-21	Speed integral separation torque percentage (based on the rated current of the motor) When P2-19=2, the feedback torque current is greater than this value and the integral separation is carried out	S T	0~500	100	%	0215h
P2-22	When P2-19=1, the position error is greater than this value and the integral separation is performed	S T	0~32767	100	×100	0216h
P2-23	Retain 4					0217h
P2-24	Current control proportional gain	P S T	0~6000	600	0.001	0218h
P2-25	Current integral time constant	P S T	1~32767	130	0.1ms	0219h
P2-26	Decay coefficient of Q axis in current loop	PST	200~1000	200	0.001	021Ah
P2-27	Decay coefficient of D axis in current loop	PST	200~1000	200	0.001	021Bh
P2-28	Preserve 5					021Ch

4.3.4 P3 group —— basic parameters

parameter	name	pattern	Parameter range	Factory value	unit	Communication address (hexadecimal)
P3-00	Parameter restore factory setting 0: no operation; 1: restore factory parameter setting; 2: absolute encoder motor zero position setting (manufacturer use) Parameter restore factory setting 0: no operation; 1: restore factory parameter setting; 2: absolute encoder motor zero position setting (manufacturer use)	P S T	0~2	0	/	0300h

P3-01	Software reset 0: no operation; 1: servo software reset; Software reset 0: no operation; 1: servo software reset; Software reset 0: no operation; 1: servo software reset;	P S T	0~1	0	/	0301h
P3-02	Set the speed of the point motion	JOG	0~6000	0	rpm	0302h
P3-03	The speed given in the test mode	OL	-6000~6000	100	rpm	0303h
P3-04	Start the speed trial run	Sr	-6000~6000	0	rpm	0304h
P3-05	Open loop operating voltage	OP	0~31000	1395	0.01V	0305h
P3-06	Open loop operating speed	OP	0~3000	18	rpm	0306h
P3-07	The automatic test speed is given		0~6000	100		0307h
P3-08	Automatically test zero speed run time	AutoTest	10~200	30	0.1s	0308h
P3-09	Automatically test high speed running time	AutoTest	10~200	60	0.1s	0309h
P3-10	Keep 3					030Ah
P3-11	Retain 4					030Bh
P3-12	Preserve 5					030Ch
P3-13	Preserve 6					030Dh
P3-14	Remainder 7					030Eh
P3-15	Adaptive notch mode selection 0: adaptive notch stop updating 1: the third group of notch is effective 2: the third and fourth groups of notch are effective 3: the resonance point is detected 4: the parameters of the third and fourth groups of notch are reset; Adaptive notch mode selection 0: adaptive notch stop updating 1: the third group of notch is effective 2: the third and fourth groups of notch are effective 3: the resonance point is detected 4: the parameters of the third and fourth groups of notch are reset;	PST	0~4	0	-	030Fh
P3-16	Retain 9					0310h

P3-17	Motor stop mode function 0: free stop, long stop time 1: deceleration stop, P4-02 time Motor stop mode function 0: free stop, long stop time 1: deceleration stop, P4-02 time	PST	0~2	0	/	0311h
P3-18	continue to have	PST	0~500	100	/	0312h
P3-19	The time when the motor stops with inertia at zero speed		0~30000	500	1ms	0313h
P3-20	Enables effective delay time	PST	0~10000	50	1ms	0314h
P3-21	The brake output is OFF to delay the motor not being powered	PST	0~10000	150	1ms	0315h
P3-22	0: Immediately output the brake signal according to the running state; 1: After the delay P3-23 time, the brake signal is output according to the running state;	ST	0~1	0	/	0316h
P3-23	Brake output signal delay	PST	0~10000	150	1ms	0317h
P3-24	continue to have	PST	0~1	0	/	0318h
P3-25	The delay alarm time for brake failure	PST	20~10000	2000	1ms	0319h
P3-26	Encoder command word 1: read single circle position; 2: read multiple circle position; 4: reset multiple circle value; Encoder command word 1: read single circle position; 2: read multiple circle position; 4: reset multiple circle value;	PST	1~5	2	/	031Ah
P3-27	Display parameters on the power supply	PST	0~60	8	/	031Bh
P3-28	Parameter locking	PST	0	0	/	031Ch
P3-29	continue to have	PST	0~1	0	/	031Dh
P3-30	Resonant frequency identification results	PST	0~4000	0	Hz	031Eh
P3-31	Frequency of the first group of notch filters	PST	50~4000	4000	Hz	031Fh
P3-32	Group 1 notch filter width class	PST	0~20	2	-	0320h
P3-33	Depth level of the first group of notch filters	PST	0~99	0	-	0321h

P3-34	The frequency of the second group of notch filters	PST	50~4000	4000	Hz	0322h
P3-35	The second group of notch filter width levels	PST	0~20	2	-	0323h
P3-36	The depth level of the second group of notch filters	PST	0~99	0	-	0324h
P3-37	Frequency of the third group of notch filters	PST	50~4000	4000	Hz	0325h
P3-38	The third group of notch filter width levels	PST	0~20	2	-	0326h
P3-39	The third group of notch filters has a depth level	PST	0~99	0	-	0327h
P3-40	The frequency of the fourth group of notch filters	PST	50~4000	4000	Hz	0328h
P3-41	Fourth group of notch filter width levels	PST	0~20	2	-	0329h
P3-42	The depth level of the fourth group of notch filters	PST	0~99	0	-	032Ah

4.3.5 P4 group —— speed and torque parameters

parameter	name	pattern	Parameter range	Factory value	unit	Communication address (hexadecimal)
P4-00	Speed mode speed given source 0: internal speed 1: external AI1 input 2: external AI2 input 3: external pulse frequency 4: communication given (P1-00=3) Speed mode speed given source 0: internal speed 1: external AI1 input 2: external AI2 input 3: external pulse frequency 4: communication given (P1-00=3) Speed mode speed given source 0: internal speed 1: external AI1 input 2: external AI2 input 3: external pulse frequency 4: communication given (P1-00=3) Speed mode speed given source 0: internal speed	S	0~2	0	/	0400h

	1: external AI1 input 2: external AI2 input 3: external pulse frequency 4: communication given (P1-00=3) Speed mode speed given source 0: internal speed 1: external AI1 input 2: external AI2 input 3: external pulse frequency 4: communication given (P1-00=3)					
P4-01	Speed control acceleration time	ST	0~30000	100	10ms	0401h
P4-02	Speed control deceleration time	ST	0~30000	100	10ms	0402h
P4-03	Current output ratio	P S T	0~500	350	%	0403h
P4-04	Current output limiting (retention)	P S T	0~1300	950	/	0404h
P4-05	Filter switching speed threshold	ST	0~3000	10	/	0405h
P4-06	Speed loop output torque limit in thousandths (based on motor rated current)	ST	0~5000	2000	‰	0406h
P4-07	Speed detection low pass filter coefficient	P S	1~2000	50	%	0407h
P4-08	Source of torque mode speed limit: 0: internal speed 1: external AI1 input 2: external AI2 input 3: external pulse frequency Source of torque mode speed limit: 0: internal speed 1: external AI1 input 2: external AI2 input 3: external pulse frequency Source of torque mode speed limit: 0: internal speed 1: external AI1 input 2: external AI2 input 3: external pulse frequency Source of torque mode speed limit: 0: internal speed 1: external AI1 input 2: external AI2 input	T	0~2	0	/	0408h

	3: external pulse frequency Source of torque mode speed limit: 0: internal speed 1: external AI1 input 2: external AI2 input 3: external pulse frequency					
P4-09	P4-08 = 0 is the speed setting value	T	-6000~6000	200	rpm	0409h
P4-10	Torque is given by source 0: internal torque is given 1: external AI1 input 2: external AI2 input Torque is given by source 0: internal torque is given 1: external AI1 input 2: external AI2 input Torque is given by source 0: internal torque is given 1: external AI1 input 2: external AI2 input Torque is given by source 0: internal torque is given 1: external AI1 input 2: external AI2 input	P S T	0~2	0	/	040Ah
P4-11	Internal torque command 1/torque limit	T	-1000~1000	200	‰	040Bh
P4-12	Internal torque command 2		-1000~1000	300	‰	040Ch
P4-13	Internal torque command 3		-1000~1000	400	‰	040Dh
P4-14	Current detection low pass filter coefficient	P S T	1~2000	60	%	040Eh
P4-15	The speed reaches the judgment threshold	PS	0~6000	1000	Rpm	040Fh
P4-16	Torque mode direction control source 0: positive and negative speed control; 1: positive and negative torque control;	T	0~1	0	/	0410h
P4-17	Torque reaches the output delay time	P S T	0~20000	50	0.1ms	0411h
P4-18	The internal velocity is given 1	S	-6000~6000	100	rpm	0412h
P4-19	The internal velocity is given 2	S	-6000~6000	200	rpm	0413h
P4-20	The internal velocity is given 3	S	-6000~6002	300	rpm	0414h
P4-21	The internal velocity is given as 4	S	-6000~6004	500	rpm	0415h

P4-22	The internal velocity is given 5	S	-6000~6006	-500	rpm	0416h
P4-23	The internal velocity is given as 6	S	-6000~6008	-300	rpm	0417h
P4-24	The internal velocity is given 7	S	-6000~6010	-200	rpm	0418h
P4-25	The internal velocity is given as 8	S	-6000~6011	0	rpm	0419h
P4-26	Mode 3, speed direction control source 0: determined by P4-00; 1: controlled by Rev FWD terminal	ST	0~1	0	/	041Ah
P4-27	Set the torque detection value	P S T	-1000~1000	200	‰	041Bh
P4-28	Torque detection delay output time	P S T	0~20000	50	0.1ms	041Ch
P4-29	Measure torque detection minimum output time	P S T	0~32767	500	0.1ms	041Dh
P4-30	Weak magnetic gain coefficient	S			/	041Eh
P4-31	Weak magnetic output voltage margin	S			/	041Fh
P4-32	Run the alarm time	Sx	0~30000	300	0.1S	0420h
P4-33	Speed feedback filter 1	PST	0~32767	200	ms	041Fh
P4-34	Speed feedback filter 2	PST	0~32767	200	ms	041Fh

4.3.6 P5 group —— terminal input and output parameters

parameter	name	pattern	Parameter range	Factory value	unit	Communication address (hexadecimal)
P5-00	DI1 input function planning ① The low 2 bits are the input pin planning function code (refer to Table 4.4 on page P68 for specific functions) ② The third bit indicates that the corresponding DI signal is forced to be valid ③ The fourth bit indicates that the corresponding DI signal is inverted	P S T	0~1140	1 （SON）	/	0500h

	DI1 input function planning ① The low 2 bits are the input pin planning function code (refer to Table 4.4 on page P68 for specific functions) ② The third bit indicates that the corresponding DI signal is forced to be valid ③ The fourth bit indicates that the corresponding DI signal is inverted DI1 input function planning ① The low 2 bits are the input pin planning function code (refer to Table 4.4 on page P68 for specific functions) ② The third bit indicates that the corresponding DI signal is forced to be valid ③ The fourth bit indicates that the corresponding DI signal is inverted DI1 input function planning ① The low 2 bits are the input pin planning function code (refer to Table 4.4 on page P68 for specific functions) ② The third bit indicates that the corresponding DI signal is forced to be valid ③ The fourth bit indicates that the corresponding DI signal is inverted					
P5-01	DI2 function (refer to Table 4.4 for specific functions) DI2 function (refer to Table 4.4 for specific functions)	PST	0~1140	10 （SPD1	/	0501h
P5-02	DI3 function (refer to Table 4.4 for specific functions) DI3 function (refer to Table 4.4 for specific functions)	PST	0~1140	11 （SPD2	/	0502h

P5-03	DI4 function (refer to Table 4.4 for specific functions) DI4 function (refer to Table 4.4 for specific functions)	PST	0~1140	2（ARST）	/	0503h
P5-04	Function planning of DI5 (refer to Table 4.4 for specific functions) Function planning of DI5 (refer to Table 4.4 for specific functions)	PST	0~1140	8（PCLR	/	0504h
P5-05	DI input filter time	PST	0~10000	30	0.1ms	0505h
P5-06	DI6 Functional Planning (retained)				/	0506h
P5-07	DI7 Functional Planning (retained)				/	0507h
P5-08	DI8 Functional Planning (retained)				/	0508h
P5-09	DI9 Functional Planning (retained)				/	0509h
P5-10	Output torque value is stored when power is lost	TQ			/	050Ah
P5-11	When the analog input is used as the speed reference, the corresponding speed is ± 10 of the analog input. When the pulse input is used as the speed reference, the corresponding speed is the highest frequency of the pulse input. When the analog input is used as the speed reference, the corresponding speed is ± 10 of the analog input. When the pulse input is used as the speed reference, the corresponding speed is the highest frequency of the pulse input.	S	-6000~6000	3000	rpm	050Bh
P5-12	When the power is lost, the current coil diameter is stored	TQ			0.1mm	050Ch
P5-13	The maximum frequency of the pulse input in speed mode	T	0~500	100	/	050Dh
P5-14	(continue to have)					050Eh

P5-15	(continue to have)					050Fh
P5-16	（ continue to have ）					0510h
P5-17	AI input below the lower limit selection: AI1 input 1: below the lower limit value is zero. 0: below the lower limit value is P5-24. AI2 input 1: below the lower limit value is zero. 0: below the lower limit value is P5-33. AI input below the lower	ST	0~11	0	/	0511h
P5-18	AI1 filter time	PST	1~30000	2000	0.01ms	0512h
P5-19	AI1 minimum input	PST	0~500	20	0.01V	0513h
P5-20	AI1 minimum input corresponds to the setting	PST	0~1000	0	‰	0514h
P5-21	AI1 maximum input	PST	500~1000	1000	0.01V	0515h
P5-22	AI1 maximum input corresponds to the setting	PST	500~1000	1000	‰	0516h
P5-23	AI2 filter time	PST	1~30000	2000	0.01ms	0517h
P5-24	AI2 minimum input	PST	0~500	20	0.01V	0518h
P5-25	AI2 minimum input corresponds to the setting	PST	0~1000	0	‰	0519h
P5-26	AI2 maximum input	PST	500~1000	1000	0.01V	051Ah
P5-27	AI2 maximum input corresponds to the setting	PST	500~1000	1000	‰	051Bh
P5-28	Preserve 5				/	051Ch
P5-29	Preserve 6				/	051Dh
P5-30	The direction of operation limit is valid level. When running in positive direction: 0: prohibit the valid high level of positive drive; 1: prohibit the valid low level of positive drive. When running in negative direction: 0: prohibit the valid high level of negative drive; 1: prohibit the valid low level of negative drive The direction of operation limit is valid level. When running in positive direction: 0: prohibit the high level of positive drive from being valid; 1: prohibit the low level of positive drive from being valid.	P S T	0~1	0	/	051Eh

	When running in negative direction: 0: prohibit the high level of negative drive from being valid; 1: prohibit the low level of negative drive from being valid The direction of operation limit is valid level. When running in positive direction: 0: prohibit the high level of positive drive from being valid; 1: prohibit the low level of positive drive from being valid. When running in negative direction: 0: prohibit the high level of negative drive from being valid; 1: prohibit the low level of negative drive from being valid The direction of operation limit is valid level. When running in positive direction: 0: prohibit the high level of positive drive from being valid; 1: prohibit the low level of positive drive from being valid. When running in negative direction: 0: prohibit the high level of negative drive from being valid; 1: prohibit the low level of negative drive from being valid The direction of operation limit is valid level. When running in positive direction: 0: prohibit the high level of positive drive from being valid; 1: prohibit the low level of positive drive from being valid. When running in negative direction:					

	0: prohibit the high level of negative drive from being valid; 1: prohibit the low level of negative drive from being valid The direction of operation limit is valid level. When running in positive direction: 0: prohibit the high level of positive drive from being valid; 1: prohibit the low level of positive drive from being valid. When running in negative direction: 0: prohibit the high level of negative drive from being valid; 1: prohibit the low level of negative drive from being valid					
P5-31	Prohibit positive drive and prohibit negative drive to be effective at the same time. Fault shielding: 0: shield; 1: effective	PST	0~1	0	/	051Fh
P5-32	Encoder Z signal output Angle	PST	0~3559	0	0.1°	0520h
P5-33	continue to have					0521h
P5-34	continue to have					0522h
P5-35	continue to have					0523h
P5-36	continue to have					0524h
P5-37	continue to have					0525h
P5-38	DO1 output setting: The low 2 bits are the output function planning (refer to Table 4.5 on page P70); The 4th bit is the output logic level setting (1: level inversion) DO1 output setting: The low 2 bits are the output function planning (refer to Table 4.5 on page P70); The 4th bit is the output logic level setting (1: level inversion) DO1 output setting: The low 2 bits are the output function planning (refer to	PST	0~1135	1	/	0526h

	Table 4.5 on page P70); The 4th bit is the output logic level setting (1: level inversion)					
P5-39	DO2 output Settings are the same as P5-38	PST	0~1135	2	/	0527h
P5-40	DO3 output Settings are the same as P5-38	PST	0~1135	9	/	0528h
P5-41	（ continue to have ）					0529h
P5-42	(continue to have)					052Ah
P5-43	Virtual DI1 function selection	PST	0~63	8	/	052Bh
P5-44	Virtual DI2 function selection	PST	0~63	9	/	052Ch
P5-45	Virtual DI3 function selection	PST	0~63	10	/	052Dh
P5-46	Virtual DI4 function selection	PST	0~63	11	/	052Eh
P5-47	Virtual DI5 function selection	PST	0~63	12	/	052Fh
P5-48	Virtual DI6 function selection	PST	0~63	13	/	0530h
P5-49	Virtual DI7 function selection	PST	0~63	14	/	0531h
P5-50	Virtual DI8 function selection	PST	0~63	15	/	0532h
P5-51	Virtual DO1 function selection	PST	0~31	16	/	0533h
P5-52	Virtual DO2 function	PST	0~31	17	/	0534h
P5-53	Virtual DO3 function	PST	0~31	18	/	0535h
P5-54	Virtual DO4 function	PST	0~31	19	/	0536h
P5-55	Virtual DO5 function	PST	0~31	20	/	0537h
P5-56	Virtual DO6 function	PST	0~31	21	/	0538h
P5-57	Virtual DO7 function	PST	0~31	22	/	0539h
P5-58	Virtual DO8 function	PST	0~31	23	/	053Ah

4.3.7 P6 group —— Fault and protection parameters

parameter	name	pattern	Parameter range	Factory value	unit	Communication address (hexadecimal)
P6-00	Power failure detection ALE16 fault switch 0: alarm 1: no alarm Power failure detection ALE16 fault switch 0: alarm 1: no alarm Power failure detection ALE16 fault switch 0: alarm 1: no alarm	P S T	0~1	0	/	0600h

P6-01	Overcurrent interrupt enable 1: valid; 0: invalid (reserved) Overcurrent interrupt enable 1: valid; 0: invalid (reserved) Overcurrent interrupt enable 1: valid; 0: invalid (reserved)		0~1			0601h
P6-02	Motor overload protection ALE32 is off 0: on; 1: off Motor overload protection ALE32 is off 0: on; 1: off	P S T	0~1	0	/	0602h
P6-03	Motor overload protection gain	P S T	50~300	100	/	0603h
P6-04	Motor temperature detection function switch 0: detection function on; 1: detection function off;	PST	0~1	1	/	0604h
P6-05	The over-speed alarm ALE01 detects the threshold	P S T	0~6000	3000	Rpm	0605h
P6-06	Phase sequence detection function switch (reserved) 0: the detection function is on; 1: the phase sequence detection function is off; Phase sequence detection function switch (reserved) 0: the detection function is on; 1: the phase sequence detection function is off;	PST	0~1	0	/	0606h
P6-07	Monitor the time of encoder communication error times	P S T	0~300	30	second	0607h
P6-08	Battery fault diagnosis enable 1: Determine battery fault (multiple circles must be opened) 0: Do not determine Battery fault diagnosis enable 1: Determine battery fault (multiple circles must be opened) 0: Do not determine	P S T	0~1	0	/	0608h
P6-09	The previous alarm code is 1	P S T		0	/	0609h
P6-10	The previous alarm code was 2	P S T		0	/	060Ah
P6-11	The previous alarm code was 3	P S T		0	/	060Bh

P6-12	The previous alarm code was 4	P S T		0	/	060Ch
P6-13	The previous alarm code was 5	P S T		0	/	060Dh
P6-14	Driver overtemperature fault enabled: 0: report fault; 1: do not report fault	P S T	0~1	1	/	060Eh
P6-15	Motor blockage protection ALE31 enabled 0: shield; 1: enable;	P S T	0~1	1	/	060Fh
P6-16	Motor blockage protection time window	P S T	0~32767	200	ms	0610h
P6-17	Motor flywheel protection ALE28 enable 0: shield; 1: enable;	P S T	0~1	1	/	0611h
P6-18	Power line disconnection ALE10 fault 0: open; 1: shield;	P S T	0~1	1	/	0612h
P6-19	The protection of the braking resistor ALE14 enables 0: shielding; 1: enables;	P S T	0~1	1	/	0613h
P6-20	Under-voltage protection ALE03 enabled 0: shielded; 1: enabled;	P S T	0~1	1	/	0614h
P6-21	Overvoltage fault delay time	P S T	0~20.00	0	s	0615h
P6-22	Power on DI enable protection 0: no protection; 1: protection	P S T	0~1	0	/	0616h
P6-23	Drive overload protection gain	P S T	50~300	100	/	0617h
P6-24	Fault record 1: current fault 2: last fault 3: last two faults; Fault record 1: current fault 2: last fault 3: last two faults; Fault record 1: current fault 2: last fault 3: last two faults; Fault record 1: current fault 2: last fault 3: last two faults;	P S T	1~3	1	/	0618h
P6-25	Select the fault code number	P S T	-	0	-	0619h
P6-26	The selected fault is the motor speed	P S T	-	0	Rpm	061Ah
P6-27	The selected fault is the motor phase U current	P S T	-	0	0.01A	061Bh
P6-28	The selected fault is the motor phase V current	P S T	-	0	0.01A	061Ch
P6-29	The selected fault is the bus voltage	P S T	-	0	V	061Dh

4.3.8 P7 group —— multi-segment position and speed parameters

parameter	name	pattern	Parameter range	Factory value	unit	Communication address (hexadecimal)
P7-00	Internal position control, coordinate type 0: 8 segment incremental coordinate position 1: 8 segment absolute coordinate position 2: any absolute coordinate position 3: any incremental coordinate position Internal position control, coordinate type 0: 8 segment incremental coordinate position 1: 8 segment absolute coordinate position 2: any absolute coordinate position 3: any incremental coordinate position	PS	0~3	0	/	0700h
P7-01	Target position 1 is 16 bits high	P	0~32767	4	/	0701h
P7-02	Target position 1 is 16 bits lower	P	0~32767	0	/	0702h
P7-03	The automatic operation speed is given as 1	PS	-4000~4000	100	rpm	0703h
P7-04	Target position 2 is 16 bits high	P	0~32767	0	/	0704h
P7-05	Target position 2 is 16 bits lower	P	0~32767	0	/	0705h
P7-06	The automatic operation speed is given 2	PS	-4000~4000	200	rpm	0706h
P7-07	Target position 3 is 16 bits high	P	0~32767	0	/	0707h
P7-08	Target position 3 is 16 bits lower	P	0~32767	0	/	0708h
P7-09	The automatic operation speed is given 3	PS	-4000~4000	300	rpm	0709h
P7-10	Target position 4 is 16 bits high	P	0~32767	0	/	070Ah
P7-11	Target position 4 is 16 bits lower	P	0~32767	0	/	070Bh
P7-12	The automatic operation speed is given 4	PS	-4000~4000	400	rpm	070Ch
P7-13	Target position 5 is 16 bits high	P	0~32767	0	/	070Dh
P7-14	Target position 5 is 16 bits lower	P	0~32767	0	/	070Eh

P7-15	The automatic operation speed is given 5	PS	-4000~4000	-500	rpm	070Fh
P7-16	The target position 6 is 16 bits high	P	0~32767	0	/	0710h
P7-17	Target position 6 is 16 bits lower	P	0~32767	0	/	0711h
P7-18	The automatic operation speed is given as 6	PS	-4000~4000	-300	rpm	0712h
P7-19	Target position 7 is 16 bits high	P	0~32767	0	/	0713h
P7-20	Target position 7 is 16 bits lower	P	0~32767	0	/	0714h
P7-21	The automatic operation speed is given 7	PS	-4000~4000	-200	rpm	0715h
P7-22	Target position 8 is 16 bits high	P	0~32767	0	/	0716h
P7-23	Target position 8 is 16 bits low	P	0~32767	0	/	0717h
P7-24	The automatic operation speed is given as 8	PS	-4000~4000	-100	rpm	0718h
P7-27	continue to have	/	/	/	/	071Bh
P7-28	continue to have	/	/	/	/	071Ch
P7-29	continue to have	/	/	/	/	071Dh
P7-30	continue to have	/	/	/	/	071Eh
P7-31	continue to have	/	/	/	/	071Fh
P7-32	continue to have	/	/	/	/	0720h
P7-33	continue to have	/	/	/	/	0721h
P7-34	continue to have	/	/	/	/	0722h
P7-35	continue to have	/	/	/	/	0723h
P7-36	continue to have	/	/	/	/	0724h
P7-37	continue to have	/	/	/	/	0725h
P7-38	continue to have	/	/	/	/	0726h
P7-39	continue to have	/	/	/	/	0727h
P7-40	continue to have	/	/	/	/	0728h
P7-41	continue to have	/	/	/	/	0729h
P7-42	continue to have	/	/	/	/	072Ah

4.3.9 P8 group —— motor parameters

parameter	name	pattern	Parameter range	Factory value	unit	Communication address (hexadecimal)
P8-00	Rated motor current	P S T	0~1000	28	0.1A	0800h
P8-01	Maximum output current frequency	P S T	20~600	200	Hz	0801h
P8-02	Number of poles of the motor	P S T	1~100	4	/	0802h

P8-03	Motor zero offset (retained)	P S T	0~360	21	linear measure	0803h
P8-04	Rated voltage (retained)					0804h
P8-05	Rated power (retained)					0805h
P8-06	Rated current (retained)					0806h
P8-07	Rated torque (retained)					0807h
P8-08	Maximum torque (retained)					0808h
P8-09	Rated speed (retained)					0809h
P8-10	Maximum speed (retained)					080Ah
P8-11	Inertia of rotation (retained)					080Bh
P8-12	Number of motor poles (retained)					080Ch
P8-13	Stator phase resistance (retained)					080Dh
P8-14	Q-axis inductance (retained)					080Eh
P8-15	D-axis inductance (retained)					080Fh
P8-16	Linear back EMF coefficient (retained)					0810h
P8-17	Read the encoder switch on the power supply: 0: off; 1: on;					0811h
P8-18	Electrical constant Te (retained)					0812h
P8-19	Mechanical constant Tm (retained)					0813h
P8-20	Encoder type (retained)					0814h
P8-24	Motor zero offset (retained)					0815h

4.3.10 P9 group —— communication parameters

parameter	name	pattern	Parameter range	Factory value	unit	Communication address (hexadecimal)
P9-00	Station number set	P S T	1~127	1		0900h
P9-01	Communication transmission rate 0: 4800 1:9600 2:19200 3:38400 4:57600 5:115200 0：4800 1：9600 2：19200 3：38400 4：57600 5：115200	P S T	0~4	3	/	0901h

P9-02	Communication protocol 0: no parity 8+N+1; 1: odd parity 8+O+1; 2: even parity 8+E+1; 3: no parity 8+N+2; 4: odd parity 8+O+2; 5: even parity 8+E+2; Communication protocol 0: no parity 8+N+1; 1: odd parity 8+O+1; 2: even parity 8+E+1; 3: no parity 8+N+2; 4: odd parity 8+O+2; 5: even parity 8+E+2;	P S T	0~5	0	/	0902h
P9-03	Communication timeout alarm time	P S T	0~100	0	1ms	0903h
P9-04	Determine the frame header time	P S T	0~100	3	1ms	0904h
P9-05	（ continue to have ）					0905h
P9-06	Response delay time of the slave communication	P S T	0~100	1	1ms	0906h
P9-07	Communication write parameter is updated to EPROM (cannot be changed in communication) 0: not update; 1: update; Communication write parameter is updated to EPROM (cannot be changed in communication) 0: not update; 1: update;	P S T	0~1	0	/	0907h
P9-08	Communication control DI enabled 0: invalid; 1: valid; Communication control DI enabled 0: invalid; 1: valid;	P S T	0~1	0	/	0908h
P9-09	continue to have					0909h
P9-10	Communication control DO enabled, 0: invalid, 1: valid	PST	0~1	0	/	090Ah
P9-11	continue to have					090Bh
P9-12	Upper computer related parameter 1	P S T	0~32767	1	/	090Ch
P9-13	Upper computer related parameters 2	P S T	0~32767	1	/	090Dh

4.3.11 PA group —— Tension control parameters

parameter	name	pattern	Parameter range	Factory value	unit	Communication address (hexadecimal)
PA-00	Initial diameter of the coil is set	TQ	0~30000	1000	0.1mm	0A00h
PA-01	Material thickness setting	TQ	0~1000	5	0.01mm	0A01h
PA-02	Linear speed setting (constant linear speed mode)	S	0~30000	100	0.1m/S	0A02h
PA-03	Tension mode, 0: tension mode is off, 1: linear tension mode; 2: winding diameter tension mode; Tension mode, 0: tension mode is off, 1: linear tension mode; 2: winding diameter tension mode; Tension mode, 0: tension mode is off, 1: linear tension mode; 2: winding diameter tension mode;	TQ	0~2	0	/	0A03h
PA-04	Constant linear velocity mode enabled 0: off; 1: on; Constant linear velocity mode enabled 0: off; 1: on;	S	0~1	0	/	0A04h
PA-05	Transmission ratio molecules	TQ	1~200	1	/	0A05h
PA-06	Transmission ratio denominator	TQ	1~200	1	/	0A06h
PA-07	Winding mode: 0: unwinding, 1: winding; Winding mode: 0: unwinding, 1: winding;	TQ	0~1	1	/	0A07h
PA-08	Time for judging the break detection	TQ	0~30	0	second	0A08h
PA-09	Minimum bore	TQ	0~20000	1000	0.1mm	0A09h
PA-10	Maximum bore	TQ	0~20000	5000	0.1mm	0A0Ah
PA-11	Maximum line speed (constant line speed mode)	S	0~30000	300	0.1m/s	0A0Bh
PA-12	Change in tension	TQ	0~32767	1	‰	0A0Ch
PA-13	Change the number of turns in tension	TQ	0~1000	10	/	0A0Dh
PA-14	maximum output torque	TQ	0~1000	1000	‰	0A0Eh
PA-15	Minimum output torque	TQ	0~1000	100	‰	0A0Fh

4.4 Digital input (DI) function code planning table

set value	name	function declaration	Function code description	Trigger mode	pattern
1	SON	Servo start	OFF-Servo motor enable disable ON-Servo motor power on enable	level triggered	P S T
2	ALRS	Alarm reset signal	Remove the drive fault alarm	Triggered	P S T
3	SHOLD	Internal speed command is suspended	When the internal speed is running, the signal is valid for a period of time and the servo motor decelerates and stops	level triggered	S
4	P-OT	Positive prohibition	ON: prohibit forward drive; OFF: allow forward drive;	level triggered	P S T
5	N-OT	Reverse ban	ON: prohibit reverse drive; OFF: allow reverse drive;	level triggered	P S T
6	RIL	Positive torque limit	1: When RIL=ON and FIL=OFF, the forward external torque is limited; 2: when RIL=OFF and FIL=ON, the reverse external torque is limited; 3: in other cases, both forward and reverse are limited by external torque 1: When RIL=ON and FIL=OFF, the forward external torque is limited; 2: when RIL=OFF and FIL=ON, the reverse external torque is limited; 3: in other cases, both forward and reverse are limited by external torque 1: When RIL=ON and FIL=OFF, the forward external torque is limited; 2: when RIL=OFF and FIL=ON, the reverse external torque is limited; 3: in other cases, both forward and reverse are limited by external torque	level triggered	P S T
7	FIL	Reverse torque limit		level triggered	P S T
8	PCLR	Pulse error reset	ON-Clear the retained pulse of the servo;	Along/level triggered	P

9	LOK	Zero speed clamping	ON: zero speed clamping, no speed simulation voltage is accepted, the motor is in zero speed state; OFF: accept external simulation voltage, the speed is operated according to the given voltage instruction; ON: zero speed clamping, no speed simulation voltage is accepted, the motor is in zero speed state; OFF: accept external simulation voltage, the speed is operated according to the given voltage instruction;	level triggered	ST
10	SPD1	Internal speed selection 1	Used for multi-speed switching	level triggered	ST
11	SPD2	Internal speed selection 2			
12	SPD3	Internal speed selection 3			
13	MDC	Control mode switch	Mixed control mode, used for mode switching	level triggered	PS T
14	DI_INH	Location commands are prohibited	ON-Disable pulse command input OFF-Enable pulse command input ON-Disable pulse command input	level triggered	P
15	SPDINV	Reverse the direction of speed command	ON: The instruction is in reverse direction, OFF: the default instruction direction	electrical level	S T
16	G=SEL	Speed gain switch	ON: speed gain switch, switching coefficient P2-09; OFF: no switch; ON: speed gain switch, switching coefficient P2-09;	electrical level	P S T
17	DI_GN1	The electronic gear ratio is molecularly selective 1	Refer to the description of parameters P1-11	electrical level	P
18	DI_GN2	The electronic gear ratio is molecularly selective 2		electrical level	P
19	PTRG	Internal position trigger	Multiple position trigger signals	Triggered	Pr
20	PHOLD	Internal position is suspended	ON: pause; OFF: continue running; ON: pause; OFF: continue running;	level triggered	Pr
21	SHOME	Start back at the beginning	Trigger the servo to return to the origin	Triggered	P S T
22	ORG1	Close switch signal 1	When returning to the origin, ORG1 is valid and the servo decelerates or stops	Along/level	P S T
23	ORG2	Close switch signal 2	When returning to the origin, ORG2 is valid and the servo decelerates or stops	Along/level	P S T

24	POS1	Select internal location 1	There are eight position switches	level triggered	Pr
25	POS2	Internal location selection 2			
26	POS3	Internal location selection 3			
27					
28	CLR-C	The current value of the encoder is reset to zero	Clear the current values of FN-01 and FN-02;	level triggered	PST
29	FWD	Positive operation	ON: forward operation; OFF: speed is set to zero ON: forward operation; OFF: speed is set to zero	level triggered	S
30	REV	Negative operation	ON: Reverse operation; OFF: The speed is set to zero ON: Reverse operation; OFF: The speed is set to zero	level triggered	S
31	EMG	emergency stop	ON: Stop; OFF: Continue running; ON: Stop; OFF: Continue running;	level triggered	P S T
33	JOG+	Move forward in a positive direction	It is effective when ON	level triggered	P S T
34	JOG-	Move in reverse direction	It is effective when ON	level triggered	P S T
37	MPD0	Internal position control can be switched between manual	ON: Run manually, OFF: Automatic operation;	level triggered	Pr
38	MD0	Internal position control manual speed selection 1	The internal position manually controls the speed selection	level triggered	Pr
39	MD1	Internal position control manual speed selection 2		level triggered	Pr
40	SetAxis	Setting the origin of coordinates	The edge is valid when OFF is to ON	Triggered	P
41	TQrst	Tension reset	The tension control mode is effective	level triggered	T
42	TRswk	Roll switching	The tension control mode is effective	level triggered	T

4.5 Digital output (DO) function code planning table

name	set value	function declaration	Function code description	pattern
SRDY	1	The servo is ready	Output signal after servo initialization is completed	P S T
ALRM	2	Servo alarm	Output signal in case of servo failure	P S T

ZSPD	3	Location reached	Output when the number of retained pulses is less than or equal to the set value P1-24	P
TSPD	4	Torque reached	When the motor torque reaches the set torque value, output	T
SSPD	5	Velocity reached	When the motor speed reaches the set value of P4-15, output	S
HOME	6	Zero point arrived	When the deviation of the motor from the zero point is less than P1-32, output	PST
BHF	7	Return to zero point complete	In the zero return operation, the output is made when the deviation of the motor from the zero point is less than P1-24	P
CZ	8	Motor Z phase	**The Z signal (angle can be set arbitrarily) of each rotation of the motor**	PST
BRKR	9	Motor brake	Output signal for on/off state of the servo	PST
BATM	10	The encoder battery voltage is low	Output when a low battery voltage signal from the encoder is received	PST
TCHK	11	Torque reaches the detection value	In the torque detection mode (P1-00=16), the output is generated when the torque reaches the detection value	P

4.5.1 Digital output (DO) function description:

1. SRDY Servo ready signal description

If the power on is successful and fault-free, the output level is valid; otherwise, the output level is invalid.

2. Description of ALRM alarm signal

When the servo has no alarm, the output is invalid level; otherwise, the output is valid level.

3. ZSPD position arrival signal description

When the position error is less than or equal to P1-24, delay for P1-25 time and output the valid level; when the position error is greater than P1-24, immediately output the invalid level. The invalid level is output when the machine stops.

4. Description of TSPD torque arrival signal

Under position control with torque limit (P1-00 set to 10) or under internal torque control (P1-00 set to 4), the output of the speed loop is greater than or equal to the torque limit value and the output is valid after a delay of P4-17, otherwise the output is invalid immediately.

5. Description of SSPPD speed arrival signal

In the internal position control mode (P1-00 is set to 1) and speed mode (P1-00 is set to 3), the output level is effective when the motor speed reaches the P4-15 setting value.

6. Explanation of HOME zero arrival signal

When the difference between the encoder Angle and the zero point Angle is less than P1-32 (zero point arrival position judgment threshold), the delay time P1-33 is delayed and the output level is valid.

7. Description of BHF zero return completion signal

In the zero return operation, invalid signals are output at the beginning of the zero return, and valid signals are output until the difference between the encoder Angle and the zero point Angle is less than P1-24 (the threshold for judging the completion of positioning) after the zero return is completed.

8. CZ signal output description

The frequency is controlled by the current loop, and the effective level is immediately output when the position of the detection encoder is within about 3.6 degrees of the positive or negative zero position, otherwise the invalid level is output.

9. BRKR brake signal description

After the motor is transferred to the running state, when P3-22 is set to 1, the output effective level is output after the delay of P3-23 time. When P3-22 is set to 0, the output invalid level is output. The output invalid level is output in case of shutdown or failure.

11. TCHK torque reaches the detection value signal description [Version V39 changed to be valid for all modes]

In the position control mode with torque detection (P1-00 is set to 16), if the speed loop output is greater than or equal to the torque detection value, and the delay time P4-17 is delayed, the output effective level is output. Otherwise, the output invalid level is immediately output. Function of previous version V39;

Starting version of V39: P4-27 sets the torque detection value, P4-28 torque detection reaches the delay output, and P4-29 detects the minimum output time; this DO function is applicable to all modes and is no longer limited to mode 16#.

4.6 Operation instructions for zero return of multi-turn absolute motor

When the controller is running, SHOME DI is input effective (edge input), or P1-30 is set to 1, and the zero return operation mode is entered. The following steps are performed:

Step 1: Execute the external position control mode until the time is greater than P1-33 (at this time, unit 1ms), and then move to step 2.

Step 2: Record the current position of the encoder HomeAxisCur (including multiple circles), and immediately move to step 3.

Step 3: If the zero return speed (P1-31) is zero, end the zero return operation; otherwise, calculate the travel position in the following way, and calculate the actual zero return speed according to the travel position and the zero return speed (P1-31), and then transfer to step 4.

In zero return mode 0 (P1-29 is set to 0), the position travel = HomeAxisCur-AbsaAxisSave;

Return to zero mode 1 (set P1-29 to 1),

Equivalent number of turns (integer) = (HomeAxisCur-AbsaAxisSave) / (P1-08(N3) * encPulseNum);

目标位置 = AbsaAxisSave + 当量圈数 * (P1-08(N3) * encPulseNum)

Positional distance = HomeAxisCur-target position;

Return to zero mode 2 (set P1-29 to 2),

Equivalent number of turns (integer) = (HomeAxisCur-AbsaAxisSave) / (P1-08(N3) * encPulseNum);

目标位置 = AbsaAxisSave + 当量圈数 * (P1-08(N3) * encPulseNum)

When HomeAxisCur is greater than the target position,

Positional distance =HomeAxisCur-target position- (P1-08 (N3) * encPulseNum);

When HomeAxisCur is less than the target position,

Positional position =HomeAxisCur-target position + (P1-08 (N3) * encPulseNum);

Step 4: Run the motor to the target position according to the calculated position travel and actual zero return speed in step 3.

AbsaAxisSave—— Zero point position, when the SetAxis DI input is valid (the edge from OFF to ON) under the condition of motor operation, the corresponding absolute position of encoder (including multi-circle position).

encPulseNum—— For 17-bit encoder, it is 131072;

explain：

In the zero return mode 0, the position travel is calculated according to the target position and the current encoder position, and no processing is done.

In zero return mode 1, the position travel is N times less than that in zero return mode 0. It is equivalent to taking the modulo operation of the angle between the position travel and the equivalent number of turns of the position in mode 0.

3 Zero mode 2, on the basis of zero mode 1, the motor may rotate in the opposite direction of the zero point position to minimize the travel position.

4.6.1 Instructions for the use of multiple absolute values

1、 relevant parameter

P3-26=2, read multi-loop data; P6-08=1, open the battery judgment function;

When using a motor with multiple circle absolute value, P3-26=2 and P6-08=1 are required. During the first setting, the driver reports Err-08 fault. Reset P3-01=1 once in software.

2、 The communication reads the relevant parameters

Fn-13	The encoder position is 16 bits lower per circle	**1072**	Repeat the value within a single circle of the encoder	100Dh
Fn-14	The encoder has 16 bits of high position per circle	**13**		100Eh
Fn-15	Number of encoder turns (16 bits)	**A 3265**	Encoder multi-turn 3265 (only 16 bits)	100Fh
Fn-28	The position of each motor coil is 16 bits lower than the position of the pulse instruction		Positioning instruction unit (the value of the number of multi-turn position pulses of the motor divided by the electronic gear ratio)	101Ch
Fn-29	The position of each motor coil corresponds to the position of the pulse instruction 16 bits higher			101Dh

There are two ways to confirm the current absolute position of the motor:

Method 1: Multi-circle number *131072+ single circle position = motor position pulse number;

For example: FN-15=10; FN-13=89915, FN-14=0; that is: 10*131072+89915=1400635;

Method 2: Read the value of FN-28/FN-29 directly;

This value is the value of the number of pulses divided by the electronic gear ratio, which is theoretically equal to the number of pulses issued by the PLC.

For example: FN-13=89908, FN-14=0, FN-15=9; P1-11=10000;

Then: FN-28=31323, FN-29=1, corresponding to 32 digits is: 96859.

Calculation method:(9*131072+89908)/13.1072=96859

Note: 13.1072=131072/10000 derived.

If the number of pulses per revolution is P1-11=2000, the electronic gear ratio is 131072/2000=65.536

Corresponding to the above calculation method:(9*131072+89908)/65.536=19371.

3、 matters need attention

When the zero point of the encoder needs to be calibrated, P3-26=4; the multi-turn value of the encoder is cleared. However, the single turn data will not be cleared.

Chapter 5 Trial operation with power on

5.1 Power connection

(1) Connect the power supply to the input terminal of the main circuit through the electromagnetic contactor (three-phase L1, L2, L3 and single-phase L1, L2).

After the main circuit power is connected, a delay of about 3 seconds occurs, during which the servo readiness signal (SRDY) turns on. At this point, the system can receive the servo enable signal (SON). Once the servo enable signal is confirmed to be valid, the driver outputs a valid signal, energizing the motor and putting it into operation. If the servo enable signal is invalid or an alarm is detected, the base circuit will shut off, leaving the motor in a free state.

(3) When the servo enable is connected with the power supply, the base circuit is connected about 1.5 seconds later.

(4) Frequent power on and off may damage the soft start circuit and energy consumption braking circuit. The frequency of power on and off should be limited to 5 times per hour and less than 30 times per day. If the fault cause is eliminated due to overheating of the drive unit or motor, it should be cooled for 30 minutes before power is turned on again.

- Is the power terminal wiring correct and reliable input voltage correct?
- Is there any short circuit or grounding of power line and motor line?

- Is the encoder cable connection correct?
- Is the control signal terminal connected accurately?
- Is the polarity and size of the power supply correct?
- Are the drive unit and motor firmly fixed?
- Is the motor shaft not connected to the load?

5.2 JOG operation

5.2.1 Operation process

The numerical unit of JOG operation is r/min, and the inch operation mode can be set as follows

(1) Set the parameter P1-00 = 12 to make the servo work in JOG mode.

(2) Set parameter P1-04 = 1 to enable the servo internally.

(3) Enter the parameter P3-02 and modify the parameter value to give the speed instruction.

(4) Press the key to modify the speed value of point motion. For example, P3-02=100, indicating 100r/min.

(5) After modification, press the SET key to confirm

(6) Press the key to make the servo motor rotate in the positive direction or reverse direction, and release the key to stop the operation of the servo motor immediately.

Note 1: During speed trial operation, Jog operation or test operation, if the motor has abnormal conditions such as vibration and noise, the parameters P2-00, P2-01, P2-02, P4-07 should be adjusted. For specific debugging methods, refer to the detailed parameter explanation in Chapter 4.

Note 2: After exiting the Jog mode, when you re-enter, you need to operate once or press a button to start again;

5.3.2 Parameter Settings

Necessary parameters	name	set value	unit	Parameter range	Factory value
P1-00	control model	12	/	0-31	0
P1-04	Service internal enablement	1	/	0	0
P3-02	The internal speed command for the JOG run is given	100	Rpm	0	0

5.3 Motor trial operation mode (speed mode)

5.3.1 Motor trial operation mode

(1) Set the parameter P1-00 = 11 to make the servo work in test mode one.

(2) Set parameter P1-04 = 1 to enable the servo internally.

(3) Enter the parameter P3-04 and modify the parameter value to give the speed instruction. The positive and negative values indicate the forward and reverse speed of the motor.

(4) The motor will run immediately after the parameter P3-04 is set; the speed change will be effective immediately.

(5) After exiting the display value of P3-04 in the middle, the speed display becomes 0 when re-entering, but the actual speed of the motor remains unchanged.

Necessary parameters	name	set value	Parameter range	Factory value
P1-00	control model	11	0-31	0
P1-04	Servo enabled	1	0-1	0
P3-04	Speed values	/	-6000-6000	0

5.3.2 Motor test operation mode

(1) Set the parameter P1-00 = 13 to make the servo work in test mode two.

(2) Set parameter P1-04 = 1 to enable the servo internally.

(3) Enter the parameter P3-03 and modify the parameter value to give the speed instruction. The positive and negative values indicate the forward and reverse speed of the motor.

(4) When the value of parameter P3-03 is set, the motor will run immediately after pressing the SET key;

Necessary parameters	name	set value	Parameter range	Factory value
P1-00	control model	13	0-31	0
P1-04	Servo enabled	1	0-1	0
P3-03	Speed values	/	-6000-6000	0

5.4 Position control

5.4.1 Operation process

(1) Connect CN1 to turn off the input control signal (SON)

(2) Connect the input power supply, and the display of the drive unit lights up. If there is no alarm, display "r-0". If there is an alarm, find out the cause of the alarm until there is no alarm.

(3) Set the control mode selection parameter P1-00 to 0, and set the appropriate electronic gear ratio (P1-06~P1-10) or P1-11.

(4) Select the external position instruction pulse input form, such as pulse + direction, then P1-02 = 0.

(5) After confirming that there is no abnormality or alarm, the enable signal (SON) is in ON state. At this time, the motor is excited and at zero speed.

(6) The operation position pulse signal is output to CN1_42, CN1_43, CN1_14 and CN1_15 pins to make the motor run according to the instruction.

(7) If the rotation direction of the motor is not consistent with the actual required direction, set P1-01 to 1 (direction reversal).

(8) In the monitoring state, Fn-01 and Fn-02 can display the encoder feedback of the current pulse value; Fn-03 and Fn-04 can display the input pulse value of the position instruction from the upper computer.

5.4.2 Parameter Settings

Necessary parameters	name	unit	Parameter range	Factory value
P1-00	control model	/	0-31	0
P1-01	Direction of the command	/	0-3	0
P1-04	Service internal enablement	/	0-1	0
P1-06	Electrical gear ratio molecules (N1)	/	1-32767	1
P1-10	The denominator of the electronic gear (M)	/	1-32767	1
P1-11	Number of pulses per revolution	Puls	1-32767	0
P2-00	Speed control proportional gain	0.1	5-1280	155
P2-01	Speed integral time constant 1	0.1ms	1-32767	130
P2-02	Position control proportional gain	0.1	0-2000	280
P4-07	Speed detection low pass filter coefficients	/	10-10000	100
P1-12	Select the position command smoothing function switch	/	0-1	0
P1-13	Location command smoothing filter coefficients	%	1-10000	200

5.5 Speed mode

(1) Set the parameter P1-00 = 3 to make the servo work in speed mode.

(2) Set parameter P1-04 = 1 to enable the servo internally.

(3) Enter parameter P4-00 and modify the parameter value to set the speed command source.

Necessary parameters	name	set value	Parameter range	Factory value	explain
P1-00	control model	3	0-31	0	
P1-04	Servo enabled	1	0-1	0	
P4-00	Speed command source	/	0-4	0	
P4-01	acceleration time	100	1-30000	100	Unit: 10MS
P4-02	deceleration time	100	1-30000	100	Unit: 10MS

P4-00 speed command source setting:

P4-00 set value	explain
0	Internal and multi-speed set speed (note 1)
1	The analog quantity Ai1 is taken as the given speed, and the speed is Ai1 voltage * (P5-11)/10
2	The analog quantity Ai2 is taken as the given speed, and the speed is Ai2 voltage * (P5-11)/10
3	Take the pulse frequency as the given speed,
4	The communication speed is given by 0.001 rev; 32-bit address: 0x1102H/0x1103H;

Note 1: When P4-00=0, select the given speed according to the table below (P4-03 can be used as the torque limit value)

SPD1	SPD2	Given velocity
0	0	P4-18
1	0	P4-19
0	1	P4-20
1	1	P4-21

5.6 Torque mode

(1) Set the parameter P1-00 = 4 to make the servo work in torque mode.

(2) Set parameter P1-04 = 1 to enable the servo internally.

(3) Parameter P4-08 sets the source of speed limit command; parameter P4-10 sets the source of torque command;

Necessary parameters	name	set value	Parameter range	Factory value	explain
P1-00	control model	4	0-31	0	
P1-04	Servo enabled	1	0-1	0	
P4-08	Speed command source	/	0-4	0	
P4-01	acceleration time	100	1-30000	100	Unit: 10MS
P4-02	deceleration time	100	1-30000	100	Unit: 10MS
P4-10	Torque command source	0	0-2	0	

P4-10 Torque control source setting:

P4-10 set value	explain
0	Internal torque given (Note 1)
1	The analog quantity Ai1 is used as the given torque, and the motor torque * (P4-06/1000) * (Ai1 voltage / 10)
2	The analog quantity Ai2 is used as the given torque, and the motor torque * (P4-06/1000) * (Ai2 voltage / 10)

P4-08 Speed command source setting:

P4-08 set value	explain
0	The internal speed is given, P4-09
1	The analog quantity Ai1 is taken as the given speed, and the speed is Ai1 voltage * (P5-11)/10
2	The analog quantity Ai2 is taken as the given speed, and the speed is Ai2 voltage * (P5-11)/10

Note 1: When P4-10=0, the torque given in the table below is pressed

DI_FIL	DI_RIL	Torque is given
0	0	Rated motor current * (P4-06/1000) * (P4-11/1000)
1	0	Rated motor current * (P4-06/1000) * (P4-12/1000)
0	1	Rated motor current * (P4-06/1000) * (P4-13/1000)
1	1	Rated motor current * (P4-06/1000) * (P4-11/1000)

Note 2: When P4-16=1, the direction of torque mode is controlled by positive/negative torque, and positive/negative AI can also control the the motor direction;

When P4-16=0, the direction of torque mode is controlled by positive and negative speed;

5.7 Instructions for the use of tension control mode

This mode is suitable for servo used in torque mode winding control. In addition to torque control, the self-power torque regulation function is added. It is suitable for low speed, torque linear change occasions. Such as bonding machine, die cutting machine, reeling machine and other equipment.

5.7.1 Parameter setting

First of all, P1-00=4, the tension control is effective in torque mode;
P4-08—— sets the speed limit of the tension mode; the positive and negative numbers of the speed determine the direction of the motor;
P4-10—— sets the source of initial tension; indicates the torque at which the tension begins to work;

parameter	name	Factory value	unit	Communication address (hexadecimal)
PA-00	Initial diameter of the coil is set	1000	0.1mm	0A00h
PA-01	Material thickness setting	5	0.01mm	0A01h
PA-02	Linear speed setting (constant linear speed mode)	100	0.1m/S	0A02h
PA-03	Tension mode, 0: tension mode is off, 1: linear tension mode; 2: winding diameter tension mode; Tension mode, 0: tension mode is off, 1: linear tension mode; 2: winding diameter tension mode; Tension mode, 0: tension mode is off, 1: linear tension mode; 2: winding diameter tension mode; Tension mode, 0: tension mode is off, 1: linear tension mode; 2: winding diameter tension mode;	0	/	0A03h
PA-04	Constant linear velocity mode enabled 0: off; 1: on; Constant linear velocity mode enabled 0: off; 1: on;	0	/	0A04h
PA-05	Transmission ratio molecules	1	/	0A05h
PA-06	Transmission ratio denominator	1	/	0A06h
PA-07	Winding mode: 0: unwinding, 1: winding; Winding mode: 0: unwinding, 1: winding;	1	/	0A07h
PA-08	Time for judging the break detection	0	second	0A08h
PA-09	Minimum bore	1000	0.1mm	0A09h
PA-10	Maximum bore	5000	0.1mm	0A0Ah

PA-11	Maximum line speed (constant line speed mode)	300	0.1m/s	0A0Bh
PA-12	Change in tension	1	‰	0A0Ch
PA-13	Change the number of turns in tension	10	/	0A0Dh
PA-14	maximum output torque	1000	‰	0A0Eh
PA-15	Minimum output torque	100	‰	0A0Fh

direction for use：

Transmission ratio: the mechanical transmission ratio from the motor to the roller;
Material thickness: set the thickness of each layer of material wound;
Initial winding: initial winding after start-up or after changing material;
When PA-03=1, open the tension control mode; (FN-44 monitors the current output torque)

1. Linear tension mode, the motor torque changes linearly;
In the winding mode, when the system is activated, it runs at the initial torque set by P4-10. The motor's output torque increases by the value of PA-12 after the motor has rotated the number of turns set by PA-13. The change in PA-12 is calculated as a percentage of the motor's rated torque. The maximum output torque, up to PA-14, remains constant.

In the unwinding mode ——, the system starts by setting the initial torque via P4-10. The motor's output torque decreases by the value of PA-12 after the motor has rotated the set number of turns (PA-13). The change in PA-12 is calculated as a percentage of the motor's rated torque. The minimum output torque up to PA-14 remains constant.

Material break alarm —— When PA-08 is not zero, the motor running speed exceeds 90% of the speed limit set by P4-08. When the motor reaches the set time of PA-08, the motor alarms and stops, and the fault code ALE05 is generated; the servo enable signal switch or the fault reset signal is valid, and the motor runs again.

2. Coil diameter tension mode, the motor torque changes according to the coil diameter;
The servo calculates the change of the diameter of the roller according to the thickness of the material, and the driver controls the motor torque according to the size of the diameter to change the constant tension. The closer the thickness of the material is to the actual tension, the higher the accuracy will be.

DI terminal function:
Di terminal function 41 indicates tension reset, which takes effect at any time; after reset, it outputs the initial torque; (reset is required after refueling!)

Terminal function 42, which indicates the switching of the roll mode, takes effect at any time; terminal function is opposite to the setting value of PA-07.

Di terminal function 15 can switch the running direction of the motor;

Chapter 6 Alarm and fault handling

- The personnel involved in the maintenance must have the corresponding professional knowledge and ability;
- Do not touch the driver and motor for at least 5 minutes after power off of the servo driver and motor to avoid electric shock and burns;
- After the driver fault alarm, the fault should be eliminated according to the alarm code before it can be put into use again;
- Before resetting the alarm, it is necessary to confirm that the SON (enable signal) signal is invalid. To prevent accidental damage caused by sudden motor start.

6.1 List of alarms

Fault code	Name of the fault	Content description
--	normal	
ALE 01	Speed alarm	The motor speed exceeds the alarm setting value
ALE 02	Overvoltage alarm	The main circuit voltage is too high alarm
ALE 03	Under-voltage alarm	The main circuit voltage is too low
ALE 04	Location out of tolerance alarm	The value of the position deviation count exceeds the alarm value
ALE 05	Tension mode breakage alarm	When the material is cut during winding, an alarm is raised; no alarm is raised when P7-40=0;
ALE 06	DI function is duplicated	The actual DI and virtual DI functions are set repeatedly
ALE 07	Disable exceptions	CCW and CW drivers are off for input
ALE 08	Encoder power failure alarm	The voltage of multi-turn absolute encoder is too low
ALE 09	obligate	
ALE 10	Motor power line break fault	The motor power line is not connected or broken
ALE 11	IPM module failure	IPM intelligent module fault alarm
ALE 12	obligate	
ALE 13	The drive is overloaded	The driver output current exceeds the rated current for too long
ALE 14	Brake failure	Drive brake circuit fault
ALE 15	obligate	
ALE 16	Main circuit power failure fault	The main circuit power is disconnected
ALE 17	Buffer circuit fault	The power buffer relay is not closed
ALE 18	Motor model is incorrect	There is no motor code on the encoder
ALE 19	Encoder disconnection alarm	The encoder is not connected or disconnected
ALE 20	Emergency stop fault	The DI input emergency stop signal is activated

ALE 21	Serial port communication error	485 serial communication error alarm
ALE 22	Current sampling fault	Current sampling circuit fault
ALE 23	obligate	
ALE 24	Encoder battery alarm	The encoder battery voltage is too low
ALE 25	The power-on encoder has read/write errors	The encoder data is read incorrectly when the power is on
ALE 26	obligate	
ALE 27	overheating fault	Driver temperature overheating alarm
ALE 28	Motor flywheel failure	The motor speed is abnormal or excessively high
ALE 29	EPROM hitch	EPROM read/write error on the driver
ALE 30	The gear ratio is wrong	The setting of the electronic gear ratio is not reasonable
ALE 31	Motor blockage fault	The motor current is too high at low speed
ALE 32	Motor overload	The motor operates for too long at a current exceeding its rated current

6.2 Fault handling method

Alarm code	Name of alarm	running state	cause	processing method
ALE01	exceed the speed limit	Occurs when the control power is turned on	① Control board failure. ② Encoder failure ① Control board failure. ② Encoder failure	① Replace the servo driver. ② Replace the servo motor. ① Replace the servo driver. ② Replace the servo motor.
		It occurs during motor operation	Motor speed exceeds the value of P6-05	Verify the electronic gear ratio and pulse frequency
			The input instruction pulse frequency is too high.	Correctly set the input instruction pulse.
			The acceleration/deceleration time constant is too small, resulting in excessive overshoot of speed.	Increase the acceleration/deceleration time constant.
			The input gear ratio is too large.	Set it right.
			Encoder fault.	Change the servo motor.
			The encoder cable is faulty.	Change the encoder cable.
			The servo system is unstable, causing overshoot.	① Reset the gain. ② If the gain cannot be set to the appropriate value, reduce the load moment of inertia ratio. ① Reset the gain. ② If the gain cannot be set to the appropriate value, reduce the load moment of inertia ratio.

		It appears when the motor starts	The load inertia is too large.	① Reduce the load inertia. ② Replace with a higher power drive and motor. ① Reduce the load inertia. ② Replace the drive and motor with a higher power.
			Encoder zero point error.	① Change the servo motor ② Ask the manufacturer to readjust the encoder zero point. ① Change the servo motor ② Ask the manufacturer to readjust the encoder zero point.
			① Motor U, V, W leads are wrong. ② Encoder cable leads are wrong.	Correct wiring.
ALE02	Overvoltage in the main circuit	Occurs when the control power is turned on	The circuit board is faulty.	Change the servo drive unit.
		Occurs when the main power is connected	① The power supply voltage is too high. ② The power supply voltage waveform is abnormal. ① The power supply voltage is too high. ② The power supply voltage waveform is abnormal.	Check the power supply for the inspection.
		It occurs during motor operation	The braking resistor wiring is disconnected.	rewiring 。
			① The braking transistor is damaged. ② The internal braking resistor is damaged. ① The braking transistor is damaged. ② The internal braking resistor is damaged.	Change the servo drive unit.
			The brake circuit capacity is insufficient (alarm when stopping)	① Reduce the start and stop frequency. ② Increase the acceleration and deceleration time constant. ③ Replace the drive and motor with a larger power. ① Reduce start/stop frequency. ② Increase acceleration/deceleration time constant. ③ Replace with a larger power drive and motor.

ALE03	main circuit undervoltage	Occurs when the main power is connected	The circuit board is faulty.	Change the servo drive unit.
			① The power supply voltage is low. ② Temporary power failure for more than 20mS. ① The power supply voltage is low. ② Temporary power failure for more than 20mS.	Check the power supply.
		It occurs during motor operation	① Insufficient power supply capacity. ② Instantaneous power failure. ③ IPM module short circuit ① Insufficient power supply capacity. ② Instantaneous power failure. ③ IPM module short circuit ① Insufficient power supply capacity. ② Instantaneous power failure. ③ IPM module short circuit	Check the power supply and IPM module
ALE04	Location is out of tolerance	Occurs when the control power is	The circuit board is faulty.	Change the servo driver.
		Connect the main power supply and control line, input the command pulse, the motor does not rotate	① Motor U, V, W leads are wrong. ② Encoder cable leads are wrong.	Correct wiring.
			Encoder fault.	Change the servo motor.
			The detection range of the set position is too small.	Increase the position out-of-tolerance detection range.
			The position ratio gain is too small.	Increase gain.
			Insufficient torque.	① Check if the machine is dead. ② Reduce the load capacity. ③ Replace with a larger power drive and motor. ① Check if the machine is dead. ② Reduce the load capacity. ③ Replace with a larger power drive and motor. ① Check if the machine is dead. ② Reduce the load capacity. ③ Replace with a larger power drive and motor.
			The command pulse frequency is too high.	Lower the frequency.

ALE06	Actual D I and communication control DI are duplicated for fault distribution	It appears when configuring the function of the DI terminal	The same DI function cannot be controlled separately by the actual terminal and communication	Reconfigure the DI input according to the communication control D I function in Section 7.4
ALE07	Disable exceptions		The CCW and CW drive prohibition input terminals are disconnected.	Check the power supply for wiring and input terminals.
ALE08	Encoder battery power failure alarm		① Motor encoder is damaged. ② Battery has no power. ③ Encoder cable is faulty. ① Motor encoder is damaged. ② Battery has no power supply. ③ Encoder cable is faulty. ① Motor encoder is damaged. ② Battery has no power supply. ③ Encoder cable is faulty.	① Replace the battery. ② Check if the encoder cable is damaged. ③ Replace the drive unit. ① Replace the battery. ② Check if the encoder cable is damaged. ③ Replace the driver unit.
ALE10	Power line break fault		The drivers U, V and W are disconnected from the motors U, V and W	Check wiring.
ALE 11	IPM module failure	It occurs when the power is turned on	① Circuit board failure. ②IPM module damage; ① Circuit board failure. ② IPM module damage;	Change the servo drive unit.
		It occurs during motor operation	Motor oscillation overshoot	Set the gain parameter properly
			① The power supply voltage is low. ② Overheating. ① The power supply voltage is low. ② Overheating.	① Check the drive unit. ② Re-power. ③ Replace the drive unit. ① Check the drive unit. ② Re-power. ③ Replace the drive unit. ① Check the drive unit. ② Re-power. ③ Replace the drive unit.
			The motor power line U, V, W is short circuit or out of phase.	Check wiring.
			bad earth.	Correct grounding.
			Motor insulation damaged.	Replace the motor.
			It's disrupted.	① Add line filters. ② Stay away from sources of interference ① Add line filters. ② Stay away from sources of interference

			Alarm when the motor stops or reverses rapidly, the load inertia is too large or the deceleration time is too short.	① Test the braking circuit and components. ② Adjust the deceleration time; ① Test the braking circuit and components. ② Adjust the deceleration time;
ALE13	The drive is overloaded	It occurs during motor operation	Operating above rated current.	① Check the load. ② Reduce the start and stop frequency. ③ Reduce the torque limit value. ④ Replace the drive and motor with a larger power ① Check the load. ② Reduce the start and stop frequency. ③ Reduce the torque limit value. ④ Replace the drive and motor with a larger power ① Check the load. ② Reduce the start and stop frequency. ③ Reduce the torque limit value. ④ Replace the drive and motor with a larger power ① Check the load. ② Reduce the start and stop frequency. ③ Reduce the torque limit value. ④ Replace the drive and motor with a larger power
			The electric brake is not open.	Check the motor hold brake.
			The motor oscillates unstably.	① High integral gain. ② Increase acceleration/deceleration time. ③ Reduce load inertia. ① High integral gain. ② Increase acceleration/deceleration time. ③ Reduce load inertia. ① High integral gain. ② Increase acceleration/deceleration time. ③ Reduce load inertia.
			① One phase of U, V and W is disconnected. ② Encoder wiring error.	Check wiring.
ALE 14	Brake failure	Occurs when the control power is connected	The circuit board is faulty.	Replace the servo drive unit.

		It occurs during motor operation	The braking resistor wiring is disconnected.	rewiring 。
			① The braking transistor is damaged. ② The internal braking resistor is damaged. ① The braking transistor is damaged. ② The internal braking resistor is damaged.	Change the servo drive unit.
		It occurs during the motor stop process	The brake circuit capacity is insufficient.	① Reduce the start and stop frequency. ② Increase the acceleration and deceleration time constant. ③ Reduce the torque limit value. ④ Reduce the load inertia. ⑤ Replace the drive and motor with a higher power one. ① Reduce the start and stop frequency. ② Increase the acceleration and deceleration time constant. ③ Reduce the torque limit value. ④ Reduce the load inertia. ⑤ Replace the drive and motor with a higher power one. ① Reduce the start and stop frequency. ② Increase the acceleration and deceleration time constant. ③ Reduce the torque limit value. ④ Reduce the load inertia. ⑤ Replace the drive and motor with a higher power one. ① Reduce the start and stop frequency. ② Increase the acceleration and deceleration time constant. ③ Reduce the torque limit value. ④ Reduce the load inertia. ⑤ Replace the drive and motor with a higher power one.
			The main circuit power supply is too high.	Check the main power supply.
ALE 16	Main circuit power failure alarm	power on	The main circuit is not powered on	Check the main power supply
			Main circuit under voltage	Check the main power supply
			Check for circuit abnormalities	Replace the drive

ALE 17	The power buffer relay is faulty	power on	The power buffer relay is damaged	Change the servo drive unit.
ALE 18	The model is invalid	power on	The motor model in the encoder is not read correctly, or the driver model is not set correctly	Replace the motor or reset P1-05; reset the driver model
ALE 19	Encoder disconnecti on alarm	Power on and run	The encoder cable is not connected or damaged	① Connect the encoder cable; ② Replace the encoder cable; ③ The encoder communication is disturbed ① Connect the encoder cable; ② Replace the encoder cable; ③ The encoder communication is disturbed ① Connect the encoder cable; ② Replace the encoder cable; ③ The encoder communication is disturbed
ALE 20	Emergency stop fault	power on	The DI_EMC input of the emergency stop DI signal is valid	In case of safety, release the emergency stop signal
ALE 21	Serial port communic ation error alarm	power on	RS485 communication error	① Check whether the communication line is in good condition ② Check whether the communication data format is correct ③ Parameter P9-03 is set too small;
ALE 22	Current sampling loop alarm	power on	The power input of the current sampling loop is incorrect	① Check whether the input power supply is within the specified range ② Check whether there are any abnormal phenomena in the amplification circuit ① Check whether the input power supply is within the specified range ② Check whether there are any abnormal phenomena in the amplification circuit
ALE24	Encoder battery under voltage alarm	power on	The encoder battery voltage is too low. This fault only alarms, and the machine will not stop. The value of Fn-21 in communication reading is 24. Fn-21 does not display the 24 fault, but the decimal point at the lowest bit of the digital tube flashes.	Change the encoder battery

ALE 25	The encoder reads data incorrectly	It occurs during the process of powering on	Encoder line is disconnected; motor encoder is abnormal. Encoder line is disconnected; motor encoder is abnormal.	① Re-execute motor installation Angle learning. ② Replace the motor.
ALE27	Overtemperature alarm	It occurs during motor operation	① The internal wiring of the driver is bad. ② The temperature is too high (the sensor is set at 85 degrees) ③ The model setting is wrong, and there is no alarm for low power ④ The cabinet volume is too small; ⑤ the ambient temperature is too high; ① The internal wiring of the driver is bad. ② The temperature is too high (the sensor is set at 85 degrees) ③ The model setting is wrong, and there is no alarm for low power ④ The cabinet volume is too small; ⑤ The ambient temperature is too high; ① The internal wiring of the driver is bad. ② The temperature is too high (the sensor is set at 85 degrees) ③ The model setting is wrong, and there is no alarm for low power ④ The cabinet volume is too small; ⑤ The ambient temperature is too high; ① The internal wiring of the driver is bad. ② The temperature is too high (the sensor is set at 85 degrees) ③ The model setting is wrong, and there is no alarm for low power ④ The cabinet volume is too small; ⑤ The ambient temperature is too high;	① Replace the driver unit ② Reduce the motor running load ③ Reduce the motor running speed ④ Increase the cooling air volume of the driver in the cabinet ⑤ Whether the built-in fan of the driver is damaged ① Replace the driver unit ② Reduce the motor running load ③ Reduce the motor running speed ④ Increase the cooling air volume of the driver in the cabinet ⑤ Whether the built-in fan of the driver is damaged ① Replace the driver unit ② Reduce the motor running load ③ Reduce the motor running speed ④ Increase the cooling air volume of the driver in the cabinet ⑤ Whether the built-in fan of the driver is damaged ① Replace the driver unit ② Reduce the motor running load ③ Reduce the motor running speed ④ Increase the cooling air volume of the driver in the cabinet ⑤ Whether the built-in fan of the driver is damaged
ALE28	Motor flywheel failure	It occurs during motor operation	① UVW phase sequence wiring error ② Motor code error ③ Motor pole logarithm error; ④ Under vertical axis working condition, the gravity load is too large ① UVW phase sequence wiring error ② Motor code error ③ Motor pole logarithm error; ④ Under vertical axis working condition, the gravity load is too large	① Connect according to the correct UVW phase sequence; ② Correctly set the motor code and parameters; ③ Reduce the vertical load, or replace with a larger torque motor, or shield the fault P6-17 without affecting safety and use

			① UVW phase sequence wiring error ② Motor code error ③ Motor pole logarithm error; ④ Under vertical axis working condition, the gravity load is too large ① UVW phase sequence wiring error ② Motor code error ③ Motor pole logarithm error; ④ Under vertical axis working condition, the gravity load is too large	
ALE29	The driver EPROM is incorrect	It occurs during motor operation	The chip or circuit board is damaged	① Replace the servo drive unit. After repair, the drive model (parameter P0-06) must be reset and then restored to default parameters
ALE30	The electronic gear ratio setting is out of range	It occurs during motor operation	The setting of the electronic gear ratio is unreasonable, and the corresponding motor pulse per revolution is less than 300.	Reasonable setting of electronic gear ratio
ALE31	Motor blockage over temperatur e protection	It occurs during motor operation	① The UVW output of the driver is out of phase or the phase sequence is wrong ② Incorrect motor parameters: the motor does not do angular identification, the number of poles and pairs of the motor is wrong ③ Mechanical factors: the load is too large, resulting in zero or low speed, or even reverse dragging, mechanical jam ① The UVW output of the driver is out of phase or the phase sequence is wrong ② Incorrect motor parameters: the motor does not do angular identification, the number of poles and pairs of the motor is wrong ③ Mechanical factors: the load is too large, resulting in zero or low speed, or even reverse dragging, mechanical jam	① Connect according to the correct UVW phase sequence; ② Correctly set the motor parameters; ③ Exclude mechanical factors ① Connect according to the correct UVW phase sequence; ② Correctly set the motor parameters; ③ Exclude mechanical factors
ALE32	Motor overload	It occurs during motor operation	Operating above rated torque.	① Check the load. ② Reduce the start and stop frequency. ③ Reduce the torque limit value. ④ Replace the drive and motor with a larger power ① Check the load.

				② Reduce the start and stop frequency. ③ Reduce the torque limit value. ④ Replace the drive and motor with a larger power ① Check the load. ② Reduce the start and stop frequency. ③ Reduce the torque limit value. ④ Replace the drive and motor with a larger power ① Check the load. ② Reduce the start and stop frequency. ③ Reduce the torque limit value. ④ Replace the drive and motor with a larger power
			The electric brake is not open.	Check the brake.
			The motor oscillates unstably.	① Adjust the gain. ② Increase the acceleration/deceleration time. ③ Reduce the load inertia. ① Adjust the gain. ② Increase the acceleration/deceleration time. ③ Reduce the load inertia. ① Adjust the gain. ② Increase the acceleration/deceleration time. ③ Reduce the load inertia.

Chapter 7 Serial MODBUS communication description

7.1 Communication parameter group

parameter	name	Applicable mode	Parameter range	Factory value	unit	Communication address (hexadecimal)
P9-00	Station number set	P S T	1~127	1		0900h
P9-01	Communication baud rate 0: 4800 1:9600 2:19200 3:38400 4:57600 5:115200 0：4800 1：9600 2：19200 3：38400 4：57600 5：115200	P S T	0~4	3	/	0901h
P9-02	Communication protocol 0: no parity 8+N+1; 1: odd parity 8+O+1; 2: even parity 8+E+1; 3: no parity 8+N+2; 4: odd parity 8+O+2; 5: even parity 8+E+2; Communication protocol 0: no parity 8+N+1; 1: odd parity 8+O+1; 2: even parity 8+E+1; 3: no parity 8+N+2; 4: odd parity 8+O+2; 5: even parity 8+E+2;	P S T	0~5	0	/	0902h
P9-03	Communication timeout alarm time	P S T	0~100	0	1ms	0903h
P9-04	Determine the frame header time	P S T	0~100	3	1ms	0904h
P9-06	Response delay time of the slave communication	P S T	0~100	1	1ms	0905h
P9-07	Communication write parameter is updated to EPROM, 0: not update; 1: update; Communication write parameter is updated to EPROM, 0: not update; 1: update;	P S T	0~1	0	/	0906h
P9-08	Communication control DI enabled 0: invalid; 1: valid; Communication control DI enabled 0: invalid; 1: valid;	P S T	0~1	0	/	0907h
P9-10	Communication control DO enabled, 0: invalid, 1: valid	PST	0~1	0	/	0908h

7.2 Format of the Agreement

1. Read the function code parameters or status word of the servo driver (command code 0x03)

ADU partial content	byte	scope
The host sends a request:		
From the machine address	1	1-0xFEH
command code	1	0x03H
The starting address of the register	2	0x0000H-0xFFFFH
Number of registers	2	0x0000H-0x0008H
CRC check (low byte first)	2	
Answer from the machine:		
From the machine address	1	Local address
command code	1	0x03H
Number of bytes read	1	0x02H
Register contents	2	Register contents
CRC verification	2	

For example, the value of parameter P1-06 is 1

The master station sends: 0x01 0x03 0x01 0x06 0x00 0x01 0x65 0xf7

Return from station: 0x01 0x03 0x02 0x00 0x01 0x79 0x84

2. Write the single function code or control parameter of the servo driver (command code 0x06)

ADU partial content	byte	scope
The host sends a request:		
From the machine address	1	1-0xFEH
command code	1	0x06H
The starting address of the register	2	0x0000H-0xFFFFH
Data content	2	0x0000H-0x0008H
CRC check (low byte first)	2	
Answer from the machine:		
From the machine address	1	Local address
command code	1	0x03H
Register address	2	0x0000H-0xFFFFH
Register contents	2	Register contents
CRC verification	2	

For example, write 2000 into parameter P1-11

Host sends: 0x01 0x06 0x01 0x0B 0x07 0xD0 0xFA 0x58

Return from machine: 0x01 0x06 0x01 0x0B 0x07 0xD0 0xFA 0x58

3. Write the single function code or control parameter of the servo driver (command code 0x09)

The difference between this command code and command code 0x06 is that data is not saved to Erpom, but only the contents of Ram are modified. That is, there is no power-off save function. Other things are the same as command code 0x06.

4. Write two consecutive function codes or control parameters (command code 0x10) for the servo driver

ADU partial content	byte	scope
The host sends a request:		
From the machine address	1	1-0xFEH
command code	1	0x10H
The starting address of the register	2	0x0000-0xFFFF
Number of registers	2	0x0001-0x007b
byte count	1	Number of registers * 2
Register contents	2* Number of registers	
CRC check (low byte first)	2	
Answer from the machine:		
From the machine address	1	Local address
command code	1	0x10
The starting address of the register	2	0x0000-0xFFFF
Number of registers	2	0x0000-0x0008
CRC verification	2	

For example, P7-01=8 and P7-02=8;

Host sends: 0110 0701 0002 04 0008 0008 9457;

Return from the machine: 0110 0701 0002 117C;

5. Communication control parameter address

parameter	Content description	Communication address (hexadecimal)
Communication is given 16 bits high	Communicate a command to a given location	1100h
Communication is 16 bits lower than the given position		1101h

Communication speed is 16 bits higher than the given speed	Communication speed (mode 3, unit 0.001 rev)	1102h
Communication speed is 16 bits lower than the given speed		1103h
Set DI for communication	Bit0~bit7 correspond to the communication setting DI1~DI8 level respectively, 0: invalid level, 1: valid level	1106h
communication control DO	Bit0~bit3 correspond to DO1~DO3 respectively, 0: invalid level, 1: valid level	1109h

6. Communication reads the status of Fn-17 input terminal and Fn-18 DO output terminal

1) Fn-17 is a decimal data. The unit, ten, hundred, thousand and ten-thousand places respectively represent the input status of DI1, DI2, DI3, DI4 and DI5. 0 means invalid and 1 means valid.

2) Fn-18 is a decimal data. The output status of D01, D02, D03, D04 and D05 is represented by the unit, ten, hundred, thousand and ten-thousand places respectively. 1 represents the high output level and 0 represents the low output level.

7.3 Communication control DIDO

7.3.1 Communication control D I function

In addition to the physical D I ports described above, the PS700 series drivers can also use all DI functions described in the communication direct control 4.4 section I/O digital input (DI) function code planning table.

To use the communication control D I function, it is divided into three steps:

Step 1: Check whether the parameters listed in Table 7.3.1 are configured for the DI function to be controlled by communication, and cancel them if they exist.

Step 2: Refer to section 4.4 I/O digital input (DI) function code planning table and set Table 7.3.2.

Step 3: Set P9-08=1 and enable the communication control D I function.

Step 4: Use communication to write the D I function status value to address 1106h (see section 7.2).

Note: The Settings of Table 7.3.1 and Table 7.3.2 cannot conflict, that is, the same DI function cannot be controlled by the actual terminal and communication respectively, otherwise fault ALE06 (DI allocation repeated fault) will be reported

Table 7.3.1

parameter	name	Applicable mode	Parameter range	Factory value	Communication address (hexadecimal)
P5-00	DI1 input function planning	PST	0~1140	1（SON）	0500h
P5-01	DI2 function planning	PST	0~1140	10（SPD1）	0501h

P5-02	DI3 function planning	PST	0~1140	11（SPD2）	0502h
P5-03	DI4 function planning	PST	0~1140	2（ARST）	0503h
P5-04	DI5 Functional planning	PST	0~1140	8(DI_CLR)	0504h

Table 7.3.2

parameter	name	1106H corresponds to a bit	Applicable mode	Parameter range	Communication address (hexadecimal)
P5-43	Virtual DI1 function selection	Bit0	PST	0~40	052Bh
P5-44	Virtual DI2 function selection	Bit1	PST	0~40	052Ch
P5-45	Virtual DI3 function selection	Bit2	PST	0~40	052Dh
P5-46	Virtual DI4 function selection	Bit3	PST	0~40	052Eh
P5-47	Virtual DI5 function selection	Bit4	PST	0~40	052Fh
P5-48	Virtual DI6 function selection	Bit5	PST	0~40	0530h
P5-49	Virtual DI7 function selection	Bit6	PST	0~40	0531h
P5-50	Virtual DI8 function selection	Bit7	PST	0~40	0532h

Bit 1106H	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	Set value 1106H	
invented DI	DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1	Base 10	Hexadecimal
Status of the DI position	0	0	0	0	0	0	0	1	1	1
	0	0	0	0	0	0	1	1	3	3
	0	0	0	0	1	1	0	1	13	D
	0	0	1	0	1	0	1	1	43	2B

7.3.2 Communication control Virtual D I is illustrated

Example 1 requires: use communication to control the forward and reverse running of the servo, enable the servo SON, and set the running speed;

parameter	set value	explain		Communication control word operation		
P1-00	3	Speed mode		command control		Speed given
P4-26	1	Speed forward and reverse control mode		1106H	Driver status	P4-18

P5-00	0	The actual DI1 function cannot be 1;		=0，=6	Stop, disable	Set the running speed
P5-43	1	Set virtual DI1 to servo enable		=1	The servo is enabled only	
P5-44	29	Set the virtual DI2 to run in forward mode		=3	Enable and run in forward direction	
P5-45	30	The virtual DI3 is set to reverse operation		=5	Enable and reverse operation	
P9-08	1	Open the communication control virtual DI function		=7	Stop, enable	

Communication data frame description:

```
01 06 11 06 00 01 AD 37 （发送使能命令）
(16 ms)
01 06 11 06 00 01 AD F7

01 06 11 06 00 00 6C F7 （使能断开）
(15 ms)
01 06 11 06 00 00 6C F7

01 06 04 12 00 64 29 14 （设定运行速度P4-18=100）
(15 ms)
01 06 04 12 00 64 29 14

01 06 11 06 00 03 2C F6 （正转运行命令）
(0 ms)
01 06 11 06 00 03 2C F6

01 06 11 06 00 05 AC F4 （反转运行命令）
(16 ms)
01 06 11 06 00 05 AC F4

01 06 11 06 00 01 AD 37 （停止保持使能状态）
(16 ms)
01 06 11 06 00 01 AD 37
```

Example 2 requires: Use communication to control the internal position of servo 3 segments, and enable the servo SON;

parameter	set value	explain		Communication control word operation	
P1-00	1	Internal location mode		command control	
P5-00	0	The actual DI1 function cannot be 1;		1106H	Driver status
P5-43	1	Set virtual DI1 to servo enable		=0，=6	Stop, disable
P5-44	24	Set virtual DI2 to POS1 function		=1	Servo enabled
P5-45	25	Set the virtual DI3 to POS2 function		=9	Trigger the first paragraph
P5-46	19	The virtual DI4 is set to trigger the start function		=0B	Trigger the second paragraph
P9-08	1	Open the communication control virtual DI function		=0D	Trigger the third paragraph

```
01 06 11 06 00 01 AD 37 （伺服使能）
(16 ms)                    注：必段保证先使能，再发触发命令；不能同时
01 06 11 06 00 01 AD 37
01 06 11 06 00 09 AC F1 （第一段位置触发，触发信号为沿触发）
(15 ms)
01 06 11 06 00 09 AC F1
01 06 11 06 00 01 AD 37 （第一段触发完成）
(15 ms)                        注：触发信号写为1有效后，需要将其写
01 06 11 06 00 01 AD 37        为0；下一次再设为1时才能重复有效。

01 06 11 06 00 0B 2D 30 （第二段位置触发）
(16 ms)
01 06 11 06 00 0B 2D 30
01 06 11 06 00 01 AD 37 （第二段触发完成）
(0 ms)
01 06 11 06 00 01 AD 37

01 06 11 06 00 0D AD 32 （第三段位置触发）
(16 ms)
01 06 11 06 00 0D AD 32
01 06 11 06 00 01 AD 37 （第三段触发完成）
(15 ms)
01 06 11 06 00 01 AD 37

01 06 11 06 00 00 6C F7 （断开伺服使能）
(31 ms)
01 06 11 06 00 00 6C F7
```

Number of sections	Location Angle set value	speed setting value	explain
Paragraph 1	P7-01/P7-02	P7-03	The motor rotates one revolution and is fixed at 131,072 pulses, regardless of the electronic gear ratio. The distance or Angle target to be traveled is calculated and converted into a number of pulses and written into a 32-bit address. The direction of each motor is determined by the positive or negative value of the speed.
the second paragraph	P7-04/P7-05	P7-06	
Paragraph 3	P7-07/P7-08	P7-09	

```
01 10 07 01 00 02 04 00 00 AA AB 2B 4C
(0 ms)
01 10 07 01 00 02 11 7C   (P7-01/P7-02=43691 对应第一段电机转120度)

01 06 07 03 00 64 79 55   (P7-03=100 电机以100的速度正转)
(15 ms)
01 06 07 03 00 64 79 55

01 10 07 04 00 02 04 00 00 AA AB EB 73
(16 ms)
01 10 07 04 00 02 01 7D   (P7-04/P7-05=43691 对应第二段电机转120度)

01 06 07 06 FF 38 28 9D   (P7-06=-200 电机以200的速度反转)
(16 ms)
01 06 07 06 FF 38 28 9D

01 10 07 07 00 02 04 00 02 00 00 35 B9
(15 ms)
01 10 07 07 00 02 F1 7D   (P7-07/P7-08=131072对应第三段电机转一圈)

01 06 07 09 01 F4 58 AB   (P7-09=500 电机以500的速度正转)
(15 ms)
01 06 07 09 01 F4 58 AB
```

matters need attention:

1、The value displayed by the driver parameter is the calculated and processed display value. If manually set, it should be converted;

2、When writing multiple words in some PLC communication instructions, the low bit is in front and the high bit is behind, so it is necessary to swap the high and low bits in the PLC program to be correct;

3、The communication data of 485 are all in hexadecimal, and the set value is mostly in decimal. Pay attention to the base conversion of data;

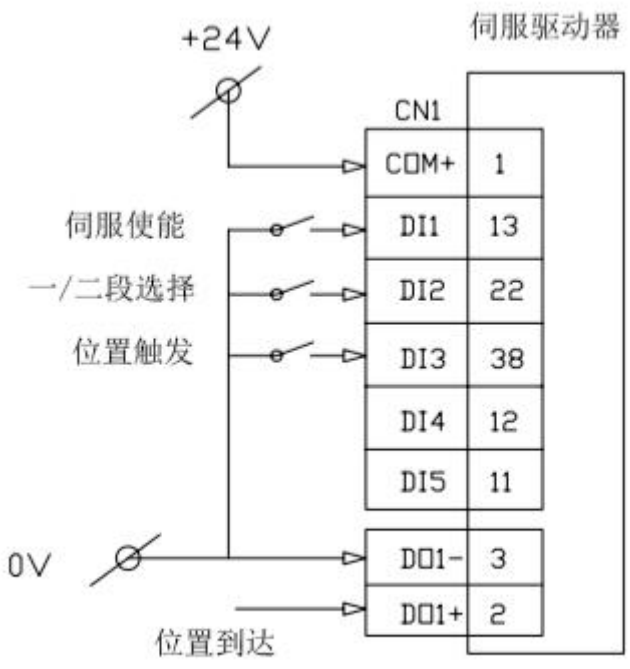
4、P4-01 and P4-02 acceleration and deceleration time are effective for internal position control;



Example

3 requires: Use DI to control the two segments of position switching operation

parameter	set value	explain
P1-00	1	Internal location mode
P4-01	50	Acceleration time 500MS
P4-02	20	The deceleration time is 200MS
P5-00	1	DI1 function is set to servo enable
P5-01	24	Set DI2 to POS1 function
P5-02	19	DI3 is set to trigger function
P5-38	3	DO1 position reaches signal output
P7-01	24	A target, the motor is turning 12 circles and 120 degrees;
P7-02	21845	
P7-03	800	A speed
P7-04	24	The second goal is that the motor reverses 12 turns and 120 degrees;
P7-05	21845	
P7-06	-2000	Second speed, reverse speed



Note: First, the servo enable.

When the selection switch of the first or second segment of terminal DI2 is not activated, the trigger command on terminal DI3 becomes active. The motor then rotates at 800 rpm to move 12 positions and 120 degrees in the first segment. Once it reaches this position, terminal DI2 becomes active again, selecting the second segment. By triggering terminal DI3 once more, the motor reverses direction and rotates at-2000 rpm to move 12 positions and 120 degrees in the

second segment. After completing this movement, the system outputs a signal indicating that the position has been reached.

About manually setting the conversion of target position data:

For example, the number of pulses corresponding to 0.1 degree is: 131072/3600=36.409, and the number of pulses corresponding to 120 degrees is: 1200*36.409=43691

The motor completes 12 full rotations, each covering 120 degrees, resulting in a total of 12 * 131072 + 43691=1616555 pulses. This number is converted to hexadecimal as 18 AAAB. Here, 18 represents the high 16 bits, which is manually set to P7-01=24 in decimal. The low 16 bits, AAAB, convert to 43691 in decimal. Since this exceeds the 16-bit range of 32767, it must be calculated using two's complement, resulting in 65536-43691 = 21845. Therefore, P7-02 = 21845. If the actual data does not exceed this range, it can be directly input.

7.3.3 Communication reads DO status

Directly read the Fn-40 hexadecimal communication address 1028h. This parameter is a decimal number, which is converted to binary, and the significance of each bit is shown in Table 7.3.3

Table 7.3.3

data bit	name	function declaration	Function code description
Bit0	-	continue to have	
Bit1	SRDY	The servo is ready	1: Ready, 0: Not ready
Bit2	ALRM	Servo alarm	1: alarm, 0: no alarm
Bit3	ZSPD	Location reached	1: reached, 0: not reached
Bit4	TSPD	Torque reached	1: reached, 0: not reached
Bit5	SSPD	Velocity reached	1: reached, 0: not reached
Bit6	HOME	Zero point arrived	1: reached, 0: not reached
Bit7	BHF	Return to zero point complete	1: completed, 0: not completed
Bit8	CZ	Motor Z signal output	1: At Z position, 0: Not at Z position
Bit9	BRKR	Motor brake	1: close the brake, 0: open the brake
Bit10	BATALRM	The encoder battery voltage is low	1: low voltage, 0: normal voltage
Bit11	TCHK	Torque reaches the detection value	1: reached, 0: not reached
Bit12	-	continue to have	
Bit13	-	continue to have	
Bit14	-	continue to have	
Bit15	-	continue to have	

7.3.4 Communication control DO function

The DO function logic selected by the hardware DO terminals (DO1~DO3) is set according to the value of parameter P9-10. The DO function logic is determined by the actual state of the driver or by the communication address 1109h.

P9-10 is displayed on the panel in decimal and converted to binary:

P9-10's bit (n)=0 indicates that the function logic of DO (n+1) is determined by the actual state of the driver;

P9-10's bit (n)=1 indicates that the function logic of DO (n+1) is determined by communication (the corresponding address of communication is 0x1109);

Setting steps:

Step 1: Set P9-10 to the required value when the machine is shut down;

Step 2: Use communication to write data to address 1109h. The bit (n) =1 of the data indicates that DO(n + 1) is valid logic, and the bit (n) =0 indicates that DO(n + 1) is invalid logic

illustrate:

According to the actual physical DO, there are only three, and P9-10 is displayed in decimal. The corresponding bit position of binary is the correct DO position.

1) When P9-10=1, only DO1 is controlled by communication. When 1H is written to address 1109h, the driver DO1 has output, and it is disconnected when 0H is written.

2) When P9-10=2, only DO2 is controlled by communication. When 2H is written to address 1109h, the driver DO2 has output, and it is disconnected when 0H is written.

3) When P9-10=3, DO1 and DO2 are actually controlled by communication. When 1H is written to address 1109h, driver DO1 has output; when 2H is written, DO2 outputs; when 3H is written, both have output at the same time; when 0H is written, both are disconnected.

4) When P9-10=7, in fact, DO1, DO2 and DO3 are all controlled by communication. When 1H is written to address 1109h, driver DO1 has output; when 2H is written, DO2 outputs; when 3H is written, both DO1 and DO2 have output at the same time; when 7H is written, all three have output; when 6H is written, DO2 and DO3 have output; when 0H is written, all are disconnected.

pay attention to:

When using a motor with brake, DO3 is the default motor brake output. Do not set DO3 to communication control at this time. Otherwise, accidental damage may occur!

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