3HSS2260 V2.0

1. **Brief Introduction**

1.1 Overview

HSS2260 is a high voltage hybrid stepping motor servo drives, a new generation of 32-bit DSP control and closed-loop control techniques, can prevent desynchronization, to ensure the accuracy of products; a high damping torque is much lower than conventional open-loop drives, can be significantly lift stepping motor torque and high-speed performance; based current control of the load, effectively reduce motor temperature, to extend the service life of the motor; built-in position in said alarm output signal and to facilitate monitoring and control of the host computer; position tolerance alarm function to ensure the safe operation of the processing equipment. Is a conventional open-loop stepper driven over the upgraded product and may replace part of a conventional servo system, only 50% of the price of AC servo system.

1.2 Feature

★ 32-bit DSP and vector closed-loop control technology;
★ closed-loop stepper systems, yet step;
★ improve the output torque and speed of the motor;
★ intelligent regulation according to the load current magnitude, reduce the temperature rise of the motor;
★ adapt various mechanical loading conditions (including low-rigidity of the load pulley and pulleys), need not be adjusted gain parameter;
★ motor run smoothly, a slight vibration, acceleration and deceleration to improve dynamic performance;
After the completion of the positioning ★, stationary vibration speed of zero capacity;
★ 86 can drive 110 series and series hybrid stepper servo motor;
★ impulse response frequency of up to 200KHZ;
★ subdivision setting(Within 200 to 65535);
★ voltage range:AC150V ~ 220V;
★ overcurrent, overvoltage, over poor protection position;
★ 6 digit LED display, can be easily set parameters and monitor the motor operating status;

1.3 typical application

Greater torque requirement for a variety of automation equipment and instruments, e.g. engraving machine, special industrial sewing machines, wire strippers, marking machines, cutting machines, laser photo plotter, NC machine tools, automated assembly equipment. Users expect little noise, the effect of the application of high-speed devices in plus.

2. Electrical, mechanical and environmental indicators

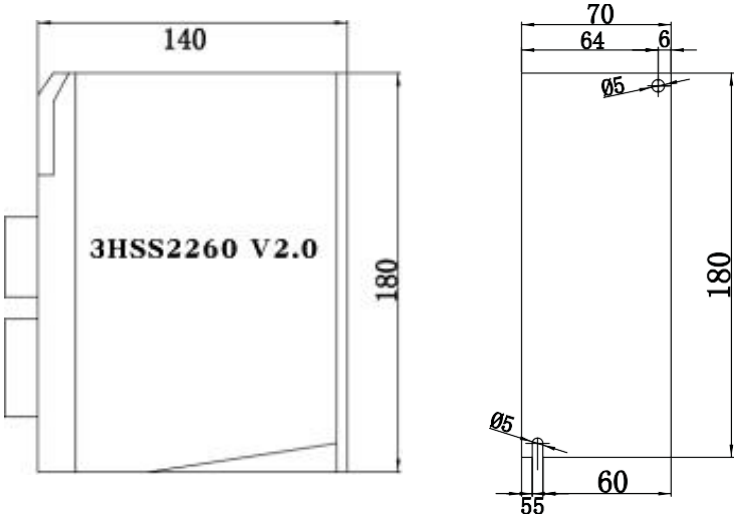
2.1 Electrical Index

Input Voltage	AC150 ~ 220V, the typical power supply AC220V
Current output	Peak 6.0A (current variable based on load)
Logic Current Input	7 ~ 20mA
Frequency	0 ~ 200KHz
Suitable motor	86 series, 110 series hybrid stepper servomotor
Encoder Resolution	1000
Insulation Resistance	> = 500MΩ

2.2 Environment Index

Cooling Method	Natural cooling or forced air cooling
Working Environment	Avoid dust, oil fog and corrosive gasses
Working Temperature	0~50℃
Humidity	40~90%RH
Vibration	5.9m/s^{2}Max
Storage Environment	-20℃~65℃
Weight	Approximate 1500g

Mechanical Specification



3. **Ports Interface**

3.1 **Power Interface Ports1**

Port	Symbol	Definition	Remark
1	L	Power supply input, L and N generally in an indirect AC 220V	
2	N		
3	NC		Air Terminal
4	Br	External braking resistor	External braking resistor connected Between Br and P +
5	P +	DC Busbar Voltage	

3.2 **Power Interface Ports2**

Port	Symbol	Definition	86	110
1	U	Motor terminals (note that color can not be mistaken wiring)	red	black
2	V		black	brown
3	W		blue	blue
4	PE	Ground	yellow	
5	L	Control power input AC220V	Range 150V ~ 220VAC	
6	N			

3.3 **Control Signal Interface Ports(44 Pins DB)**

Port	Symbol	Definition	Remark
3	PUL +	The positive input pulse	External command pulse input terminal. NOTE: The parameter set pulse input mode PA16 PA16 = 0, + sign command pulse mode (default) PA16 = 1, CCW / CW mode command pulse
4	PUL-	The negative input pulse	
5	DIR +	The direction of the positive input	
6	DIR-	Enter the negative direction	
7	ALM +	Alarm signals are being output	ALM ON: alarm, alarm output Servo ON (Output ON); ALM OFF: no alarm, the alarm output servo OFF (output Up)
8	ALM-	Negative output alarm signal	
9	PEND +	Put in place positive output signal	PEND ON: position deviation value range set in the positioning, the positioning completion output ON (output ON), otherwise the output OFF (output Up)
10	PEND-	Place a negative output signal	
11	ENA +	Enable the positive input	The enable input terminal. Parameter PA14 = 0, ENAON: drive closed to stop the work, the motor is in a free state. ENA OFF: allow the drive to work. PA14 = 1, the input polarity inversion.
12	ENA-	Enable the negative input	

23	OA +	Encoder A phase signal	Encoder A, B, Z differential drive signals (26LS31) output, non-isolated outputIf only the integrated motor encoder A, B of two channels, the signal Z is ignored.
24	OA-		
25	OB +	Encoder B-phase signal	
26	OB-		
27	OZ +	The encoder C-phase signal	
28	OZ-		
29	CZ	Encoder Z-phase collector Open output	
30	GND	Encoder public ground	

3.4 **Encoder signal input terminal (15 pin head DB)**

Port	Symbol	Definition	Remark
1	EA +	Encoder Input A +	If the motor is integrated only A, B of the two-channelEncoder signal is ignored Z
11	EA-	Encoder Input A-	
2	EB +	Encoder Input B +	
12	EB-	Encoder B-input	
7	EZ +	Encoder Input Z +	
8	EZ-	Encoder Input Z-	
13	VCC	+ 5V power supply	
3	GND	Power common ground	

3.5 RS232 communication port RS232 interface pinout definitions shown in the following table:

Port	Symbol	Definition	Remark
1	NC		
2	+ 5V	Positive power supply terminal	
3	TxD	RS232 transmitting end	
4	GND	Power Ground	
5	RxD	RS232 receiving end	
6	NC		

3.6 Input and output interface Type

Digital output interface (in place PEND, the alarm signal ALM output, etc.)

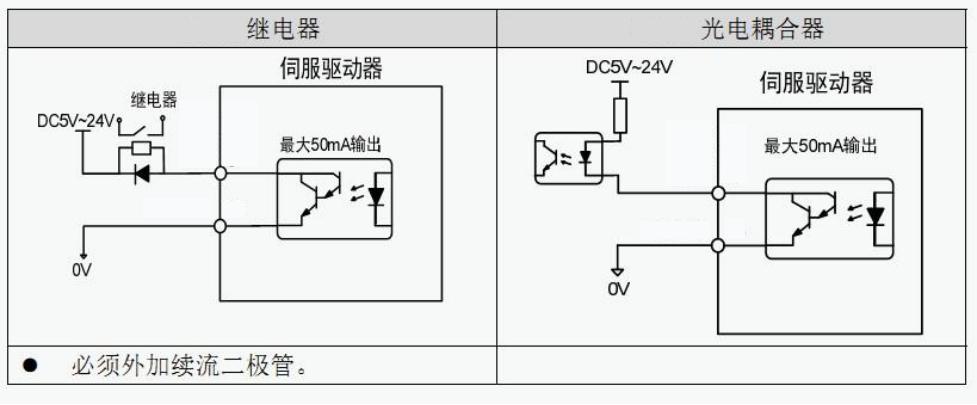
Darlington output circuit optocouplers can, a photocoupler connected to the relay Note:

★ power provided by the user, if the reverse power, can damage the drive.

★ maximum external power source 25V, the maximum output current of 50mA.

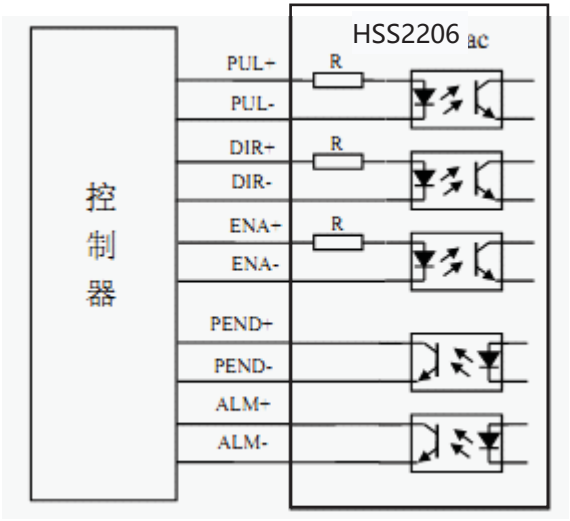
★ When using an inductive load such as a relay, a diode must be added in parallel with the inductive load, when the opposite polarity of the diode, will damage the drive.

When ★ turned around about 1V drop, can not meet the requirements of low TTL level, and therefore can not beTTLcurrent is connected.

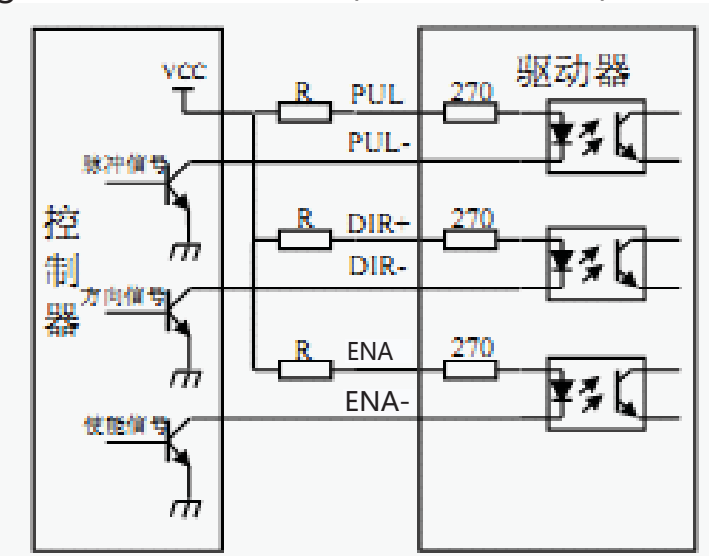


Pulse command interface (PUL, DIR, ENA)

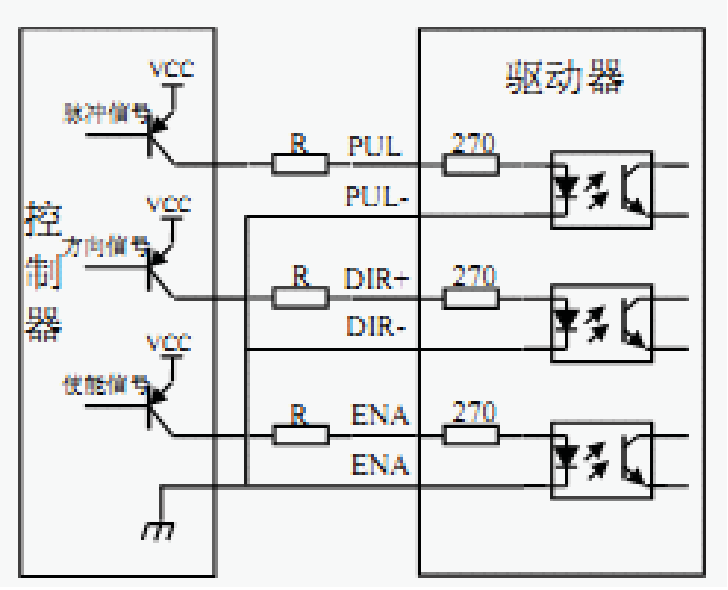
★differential drive mode



★ single-ended drive mode (common anode)



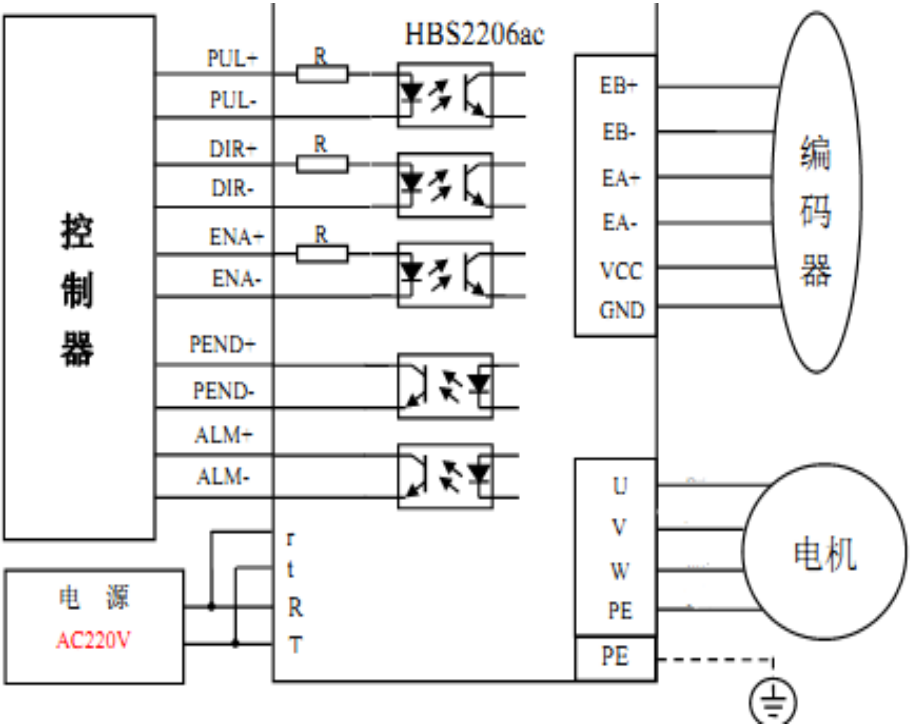
★ single-ended drive mode (common cathode)



Note: If the control signal level is + 5V, then no external control signal input terminal resistor R & lt; if the control signal level is + 12V, the control signal input terminal for an external resistor 1K; if controlBraking signal level + 24V, the control signal input terminal for an external 2K resistor.

4. Wiring

4.1 Typical Wring Diagram



5. Parameter

Parameter Configure

Code	Definition	Range	Default Value	Remark
0	Initial display state	0 to 7	0	
1	Control mode selection	0 to 1	1	
2	Current loop proportional gain	-	1000	Factory setting, modification
3	Current loop integral gain	-	200	Factory setting, modification
4	Position loop proportional gain	0 ~ 1000	300	
5	Speed loop proportional gain	0 ~ 1000	400	
6	Speed loop integral gain	0 to 300	80	
7	The number of pulses per revolution	200 to 65535	4000	
8	Encoder resolution	-	4000	Factory setting, modification 4, an encoder pulse frequency
9	Position deviation alarm threshold	40 to 65535	1000	
10	Holding current percentage	0 ~ 80	30	
11	Loop current percentage	1 to 80	60	
12	Motor type selection	0-2	0	
13	Filtering time	1 to 1500	60	Unit 66.7us, no filter is selected 0
14	Enable polarity level	0/1	1	
15	Fault polarity output level	0/1	0	
16	Single and double	0/1	0	

	pulse selection			
17	Pulse active edge	0/1	0	
18	Motor rotation direction	0/1	0	
19	JOG speed	1 to 600	120	RPM units
20	PEND signal function selection	0/1	0	
21	PEND polarity	0/1	0	
22	Acceleration	1 ~ 2000	200	r / s ^ 2
23	deceleration	1 ~ 2000	200	r / s ^ 2

Parameter Description

Parameters No.	Name	Features	Parameters
0	Initial display state	● selecting a display state on the display after the electric drive0: Display position deviation 1: Display motor speed 2: display speed command (given speed) 3: Display feedback pulse 4: shows a given pulse 5: shows the motor current given 6: fault code is displayed 7: Display bus voltage	0 to 7
1	Control mode selection	● This parameter can be set to control how the drive0: Closed-loop control mode 1: open loop control mode ● closed-loop control, position loop drive control, electric pulses according to the feedback command pulse coming from the input interface and the encoder pulse inputIntelligent machine current with the load weight changes. ● open-loop control mode, only the drive control in accordance with the position command pulse open loop pulse input interface, the motor holding current depending on a given currentPercentage, ie parameter PA10.	0 to 1
2	Current loop proportional gain	● This parameter has been based on the matching motor model Optimization, factory settings, prohibit changes.	

3	Current loop integral gain	● This parameter has been based on the matching motor model Optimization, factory settings, prohibit changes.	
4	Position loop proportional gain	● set position loop proportional gain adjuster ● The larger the value, the higher the gain, the greater the stiffness, the same frequency command pulse, the smaller the position lag. Too big value may cause vibrationSwing or overshoot. ● The value is determined according to the load.	0 ~ 1000
5	Speed loop proportional gain		0 ~ 1000
6	Speed loop integral gain		0 ~ 30

7	The number of pulses per revolution	● This parameter is to rotate the motor 1 output from the pulse ring Pulse value entered into the interface.	200 to 65535
8	Encoder resolution	● This parameter is the number after the encoder pulse frequency 4 value. Factory settings, prohibit changes.	-
9	Position deviation alarm threshold	● set alarm detection position tolerance range ● In the closed-loop control and control JOG mode,When the count value of the position error counter exceeds the parameter When the value, the drive position tolerance alarm.	40 to 30000
10	Holding current percentage	● lock machine magnitude of the current provided. ● = the current size lock machine parameter value * 100mA.	0 ~ 80
11	Loop current percentage	● setting loop current peak. ● = loop current peak parameter value * 100mA.	1 to 80
12	Motor type selection	● 0-86 Motor, 12Nm ● 1-110 Motor, 12Nm ● 2-110 Motor, 20Nm	0-2
13	Filtering time	● instruction set pulse filter time unit 66.7us, default 60, i.e. 60 * 66.7 = 4ms	0 ~ 1500
14	Enable polarity level	● set ENA +, ENA- electrode can make an input interfaceSex. ● 0: ENA +, ENA- input photocoupler madeLight pipe OFF (As), the motor is enabled, ON (ON) the motor in a free state. ● 1: ENA +, ENA- arc tube input photocoupler ON (conducting), the motor is enabled, OFF (As) motor is in a free state.	0 to 1
15	Fault polarity output level	● ALM set the polarity of the output signal. ● 0: Alarm output ON (output ON), NOThe output OFF (output up to).	0 to 1

		● 1: Alarm output OFF (as of output), NO Output ON (output ON).	
16	Single and double pulse selection	● set pulse command input. ● 0: command pulse + symbolically. ● 1: CCW / CW mode.	0 to 1
17	Pulse active edge	● 0: Normal ● 1: input command pulse of opposite polarity	0 to 1
18	Motor rotation direction	● rotating direction of the motor ● 0: the motor is transferred ● 1: Motor reverse	0 to 1
19	JOG speed	● JOG speed in PRM	1 to 600
20	PEND signal function selection	● PNED select digital output signal. ● 0: PEND place as an output signal. ● 1: PNED brake as an output signal.	0 to 1
21	PEND polarity	●PEND set the polarity of the output signal. ●Parameter is set to 0: complete output or brake positioning output ON (output ON), otherwise the output OFF (output ended). ●Parameter is set to 1: positioning completed output or brake output OFF (outputAs shown), otherwise the output ON (output ON).	0 to 1
22	Acceleration	●When the JOG acceleration unitr / s ^ 2	0 ~ 2000
23	Deceleration	●When the deceleration JOG, the unitr / s ^ 2	0 ~ 2000

6. Protective function

6.1 Alarm configure

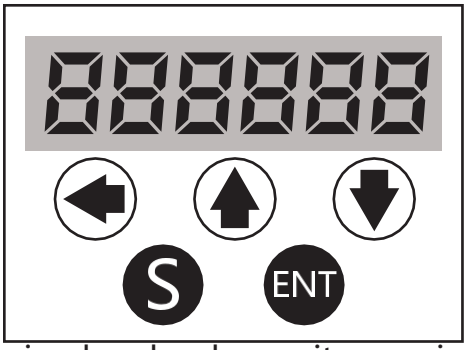
ALM Code	Alarm Definition	Description
-	Working OK	
1	Over current	Motor current is too high
2	Over voltage	Main circuit power voltage is too high
3	Position deviation error	The position deviation exceeds the set value.
4	EEPROM fault	EEPROM fault

6.2 Processing methodto Alarms

ALM Code	Alarm Definition	Reason	Processing method
1	Over current	Driver U, V, W short circuit.	Check the wiring.
		Grounding problem	Check ground.
		Motor insulation is damaged	Change a new motor.
		Driver is damaged	Change a new driver.
2	Over Voltage	When the power is turned on, the voltage is too high or too low.	Check the input power.
		The braking resistor wiring is sudden disconnected when the motor is running.	Rewiring.
		The braking resistor or braking transistor is damaged.	Change a new driver.
3	Position deviation error	When control power is turned on, circuit board is damaged.	Change a new driver.
		If motor U, V, W wrong wring or encoder wrong wring, the motor will be reverse running or not working.	Rewiring.
		Encoder is damaged	Change a new driver.
		The position deviation value range is too small.	Increase the position deviation value range.
		Position loop Kp is too low.	Increase the position loop Kp value.
		Insufficient torque.	Reduce the load or change a higher torque motor.
		Command pulse frequency is too high.	Reduce the frequency.
4	EEPROM fault	Chip or Circuit board is damaged.	Change a new driver.
		There is interference in the process of reading and writing EEPROM.	Restore the default parameters.

7. Display and keyboard

Panel consists of six LED digital display and five buttons ←, ↑, ↓, Shift, Enter composition,To display the various states of the system, set the parameters. Operation is stratified operation, ←, Enter key indicates the level of back and forward, Enter key and enter

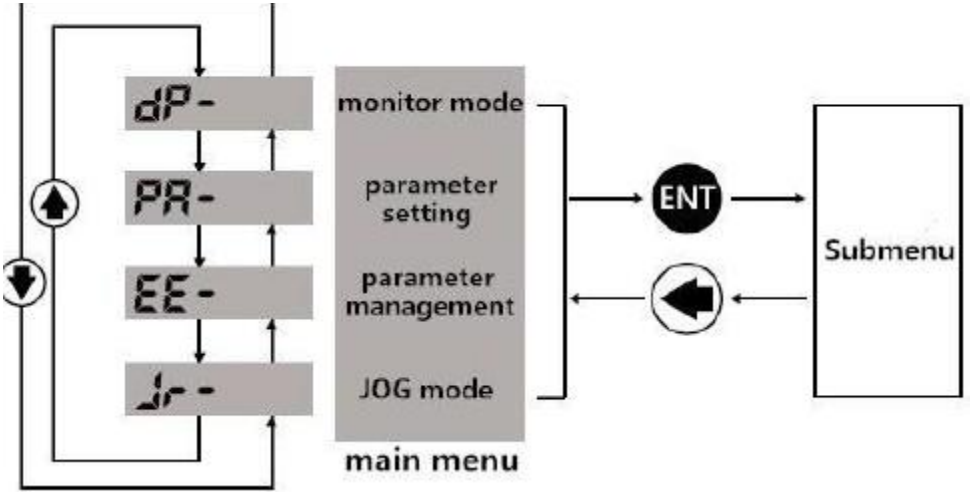


meaningful determined, ← key has quit, meaning canceled; ↑, ↓ key indicates an increase, reducing the number or value size.

Figure 6-1 Panel

7.1 First player

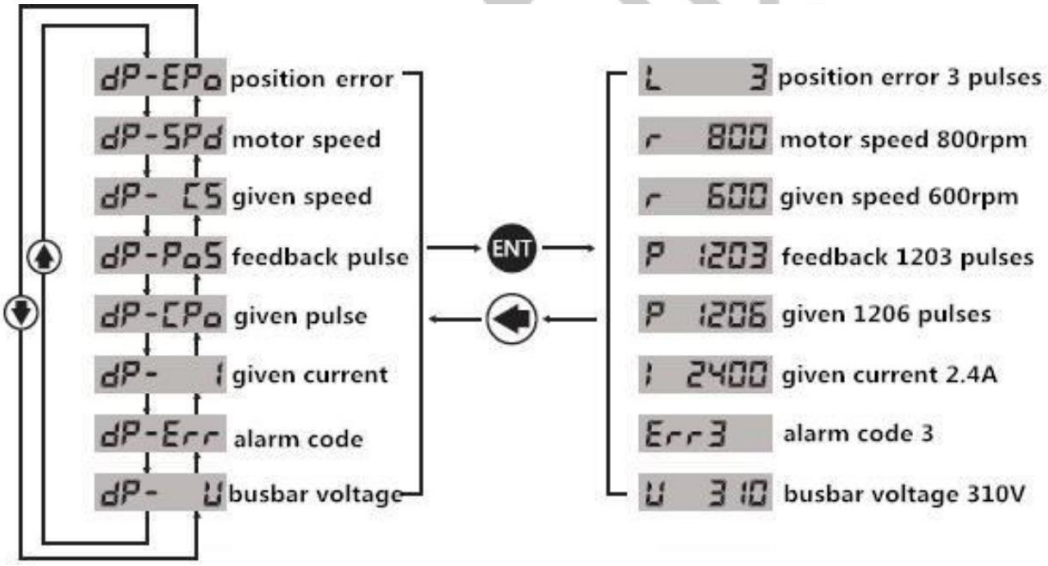
Layer 1 is used to select the operation mode, a total of 4 in the embodiment, using ↑, ↓ key to change the way, according toLayer 2 the Enter key to enter a selected mode, the ← key to return the first layer from the second layer.



7.2 PLayer 2

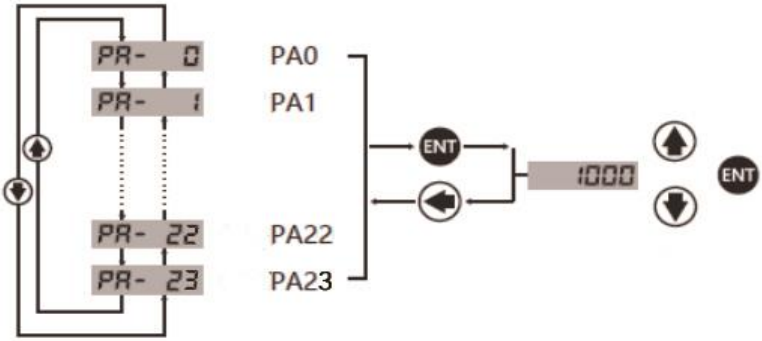
7.2.1 Monitoring mode

Select "dP-" in the first layer, and press Enter to enter the monitoring mode. There are eight kinds of display state, the user with the ↑, ↓ keys to select the desired mode is displayed, press the Enter key, you enter withThe display state of the body.



7.2.2 parameter settings

Select "PA- in the first layer ", And press Enter to enter the parameter setting. Using ↑, ↓ key to select the parameter number, press Enter, display the value of the parameter using ↑, ↓ key to change the parameter value .Shift Key to move the flashing LED, press ↑ or ↓ key once, the corresponding increase or decrease the value of a digital scintillation position. Press Enter to confirm the modification, if not satisfied with the value being modified, do not press Enter to confirm, press ← to cancel, restore the original value of the parameter and return to the parameter selection status.



7.2.3 Parameter Management

The main processing parameter management table and the parameters of operation between the EEPROM, the first layer selected in "EE-"And press Enter to enter the parameter management. You first need to select the operating mode, there are three modes, with ↑, ↓ key to select. For "parameter" for example, select the "EE-Set", and then press the Enter key for longer than three seconds, the display shows "the Start", it is a parameter indicating write EEPROM, wait approximately 1 to 2 secondsAfter a time, if the write operation succeeds, the display shows the "Done", if it fails, then the display " Error. "Press ← return to the operation mode selected state.

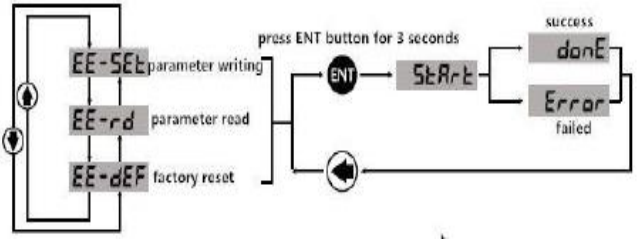
★ EE-Set parameter writing means to write the parameter table of parameter section of the EEPROM. User to modify the parameter value of the parameter RAM space only parameter table is changed, the next power will return to the original value. If you want to

permanently change the parameter value, the parameter needs to perform a write operation, the write RAM space parameter to the parameter table in EEPROM parameter area, power on again after the modified parameter.

★ EE-rd parameter read, the read data indicates the parameter area of EEPROM into RAM space parameter table. This process will be performed once at power-up, at the start, the parameter value and the area of the EEPROM parameter table in RAM space is the same. But the user to modify the parameter, the parameter will change the value of the parameter RAM space in the table, when the user changes the parameters or the parameters are disordered satisfied, perform a read operation parameter may be a parameter area to read data in EEPROM RAM space parameter table, the parameters just restored to power.

Parameter area

★ EE-dEF restore the default value, represents all the default value (initial value) of the parameter RAM space parameter table to read and write the EEPROM, the power is reapplied using default parameters. When a user parameter adjustment disorder, does not work, use this operation, all parameters can be restored to factory condition.



EEPROM parameter area ⇨ Parameter table in RAM

EE-SEt Parameter table in RAM ⇨ EEPROM parameter area

EE-rd EEPROM parameter area ⇨ Parameter table in RAM

EE-dEF Parameter ⇨ Parameter table in RAM, EEPROM parameter area

7.2.4 JOG operation

JOG mode control, i.e., to move the control provided PA1 = 2, the control mode is set to the controlling party JOGType, provided by PA19 JOG speed, in the first layer 1 Jr- Menu JOG mode interface. Pressing the ↑ and hold the motor at JOG speed operation, the key is released, the motor stops, holding zero speed; press ↓ and hold, the motor running in reverse JOG speed, the key is released, the motor stops, maintain zero speed.