Shanghai Siheng Motor Co Ltd

www.sihengmotor.com

KA Series AC Servo Driver Manual

Safety notes

⚠ **Danger means that when used incorrectly, it will lead to danger and personal injury.**

⚠ **Note: When used incorrectly, it will cause danger, personal injury and possible damage to equipment.**

🚫 **Prohibition: It means strictly prohibiting the behavior, otherwise it will lead to equipment damage or can not be used.**

Use occasion

⚠ DANGER

- It is forbidden to use the product in flammable and explosive occasions, which can easily cause injury or fire.
- It is forbidden to use the product in places with humidity, direct sunlight, dust, salt and metal powder.

Wring

- Do not connect 220V driver power to 380 power supply, otherwise it will cause equipment damage or fire.
- Please grounding terminal ⏚ reliably. Poor grounding may cause electric shock or fire.
- Do not connect the output terminal of driver U-V-W motor to three-phase power supply, otherwise it will cause casualties or fire.
- Driver UVW motor output terminal and motor connection terminal UVW must be connected correspondingly, otherwise the motor may cause equipment damage and casualties due to speeding.
- Wiring please refer to wire wiring, otherwise it may cause fire.

operation

Note

- Before starting operation, please make sure that you can start the emergency switch and shut down at any time.
- When commissioning, please separate the servo motor from the machine. After the action is confirmed, the motor is installed on the machine.
- After the servo motor stops and restores instantaneously, do not approach the machine. The machine may suddenly start again.
- Do not switch on or off the power frequently, otherwise it will cause overheating inside the driver.

Function

Stop

- When the motor is running, do not contact any rotating parts, otherwise it will cause casualties.
- When the equipment is running, it is forbidden to touch the driver and motor, otherwise it will cause electric shock or scald.
- When the equipment is running, it is forbidden to move the connecting cable, otherwise it will cause personal injury or equipment damage.

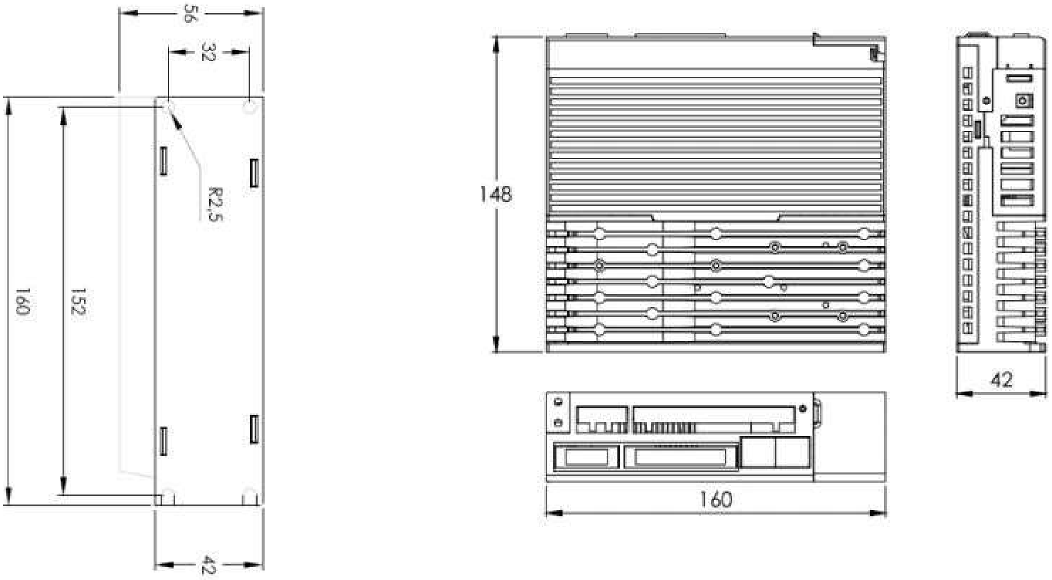
Product introduction

1.1 Servo Driver Technical Specification

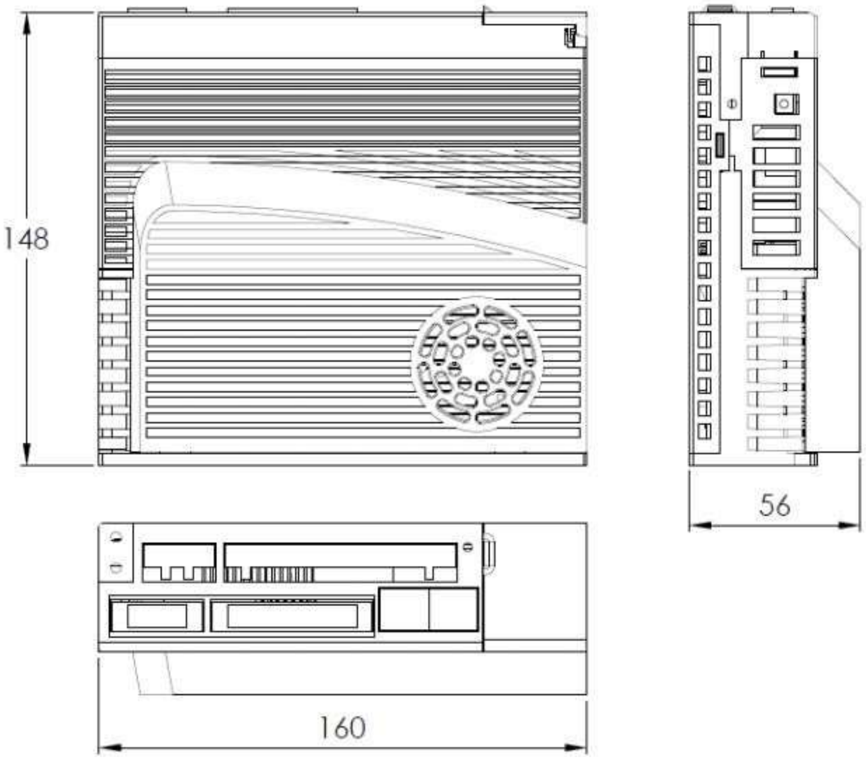
output power(kW)		0.4～0.8	1.0~1.5	1.7～2.3
Motor rated torque（N·m）		2～4	4～10	6～15
Input power supply		Single-phase or three-phase AC 50 Hz / 60Hz（0.85～1.1）× 220V	Three-phase AC 50 Hz /60Hz（0.85～1.1）×220V	
Use environment	temperature	Work: Storage at 0 ~55: -20 ~+80.		
	humidity	Less than 90 %（No dew）		
	Vibration	Less than0.5G（4.9m/s^2）10 Hz～60 Hz(Discontinuous operation)		
Control method		Position Control, Speed Control and Torque Control		
regenerative braking		Built-in (external when built-in resistance power is insufficient)		
Control characteristics		Velocity Frequency Response：≥200Hz		
		Velocity fluctuation rate: <0.03 (load 0-100%): <0.02 *0.9-1.1) power supply voltage (Value corresponds to rated speed)		
		Speed ratio：1：5000		
		Pulse frequency：≤ 500kHz		
control input		1 Servo Enablation 2 Alarm Clearance 3 CCW Drive Ban 4 CW Drive Ban Deviation counter clearing/speed selection 1_Instruction pulse prohibition/speed selection 2		
Control output		Servo Ready Output, Servo Alarm Output, Positioning Complete Output/Speed Achievement Output		
position control	Input mode	(1) Pulse + Direction (2) Two-Phase A/B Orthogonal Pulse		
	Electronic gear ratio	1～32767 / 1～32767		
	Feedback pulse	10000 Pulse / turn		
speed control		Four Internal Velocities		
Acceleration and deceleration function		Parameter setting acceleration and deceleration time 1-10000ms (0r-1000r/min)		
Monitoring function		Speed, current position, instruction pulse accumulation, position deviation, motor torque, motor current, bus voltage, absolute rotor position, instruction pulse frequency, operation status, input and output terminal signals, etc.		
Protection function		Overspeed, overvoltage and undervoltage of main power supply, overcurrent, overload, abnormal braking, abnormal encoder, abnormal control power supply, abnormal position, etc.		
Applicable load inertia		Less than 5 times the inertia of the motor		

Installation

2.1 KA03 (below 600W) Motor Driver Outward Size Diagram

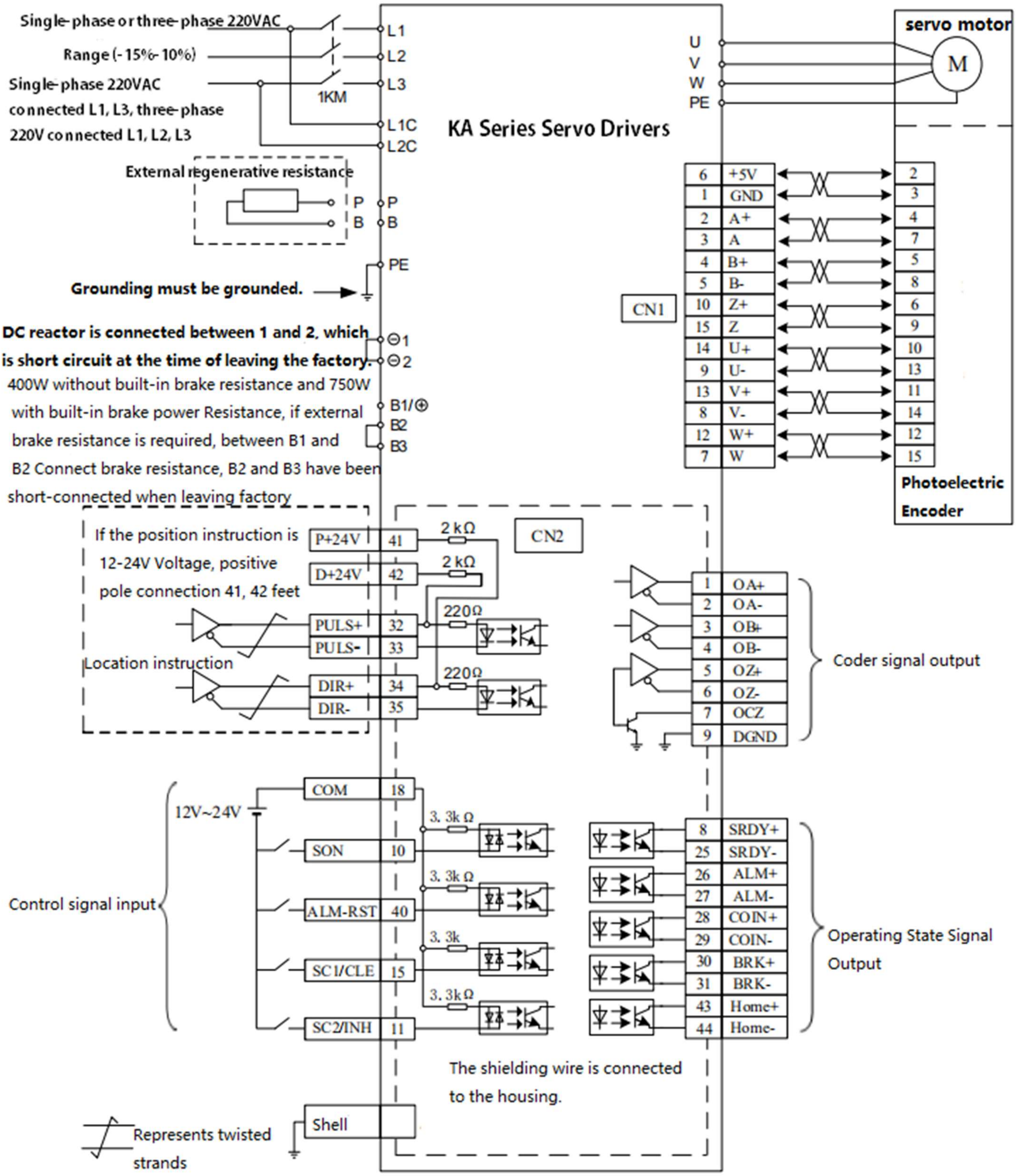

56
32
R2.5
160
152
42
148
42
160

2.2 KA05 ～ KA15（0.6 ～ 1.5 kW）Outward Size Diagram of Motor Driver



2.2.1 2.3 Standard wiring diagram

Position control mode


Single-phase or three-phase 220VAC
Range (-15%-10%)
Single-phase 220VAC connected L1, L3, three-phase 220V connected L1, L2, L3
1KM
L1
L2
L3
L1C
L2C
KA Series Servo Drivers
U
V
W
PE
servo motor
M
External regenerative resistance
P
B
PE
Grounding must be grounded.
DC reactor is connected between 1 and 2, which is short circuit at the time of leaving the factory.
⊖1
⊖2
400W without built-in brake resistance and 750W with built-in brake power Resistance, if external brake resistance is required, between B1 and B2 Connect brake resistance, B2 and B3 have been short-connected when leaving factory
B1/⊕
B2
B3
CN1
6 +5V — 2
1 GND — 3
2 A+ — 4
3 A — 7
4 B+ — 5
5 B- — 8
10 Z+ — 6
15 Z — 9
14 U+ — 10
9 U- — 13
13 V+ — 11
8 V- — 14
12 W+ — 12
7 W — 15
Photoelectric Encoder
If the position instruction is 12-24V Voltage, positive pole connection 41, 42 feet
P+24V 41
D+24V 42
2 kΩ
2 kΩ
CN2
220Ω
220Ω
PULS+ 32
PULS- 33
Location instruction
DIR+ 34
DIR- 35
1 OA+
2 OA-
3 OB+
4 OB-
5 OZ+
6 OZ-
7 OCZ
9 DGND
Coder signal output
COM 18
12V~24V
3. 3k Ω
SON 10
3. 3k Ω
ALM-RST 40
3. 3k
SC1/CLE 15
3. 3k Ω
SC2/INH 11
Control signal input
8 SRDY+
25 SRDY-
26 ALM+
27 ALM-
28 COIN+
29 COIN-
30 BRK+
31 BRK-
43 Home+
44 Home-
Operating State Signal Output
The shielding wire is connected to the housing.
Shell
Represents twisted strands

Drawing 2-3-1：Position control wiring

2.2.2 Speed/Torque Mode Wiring Diagram

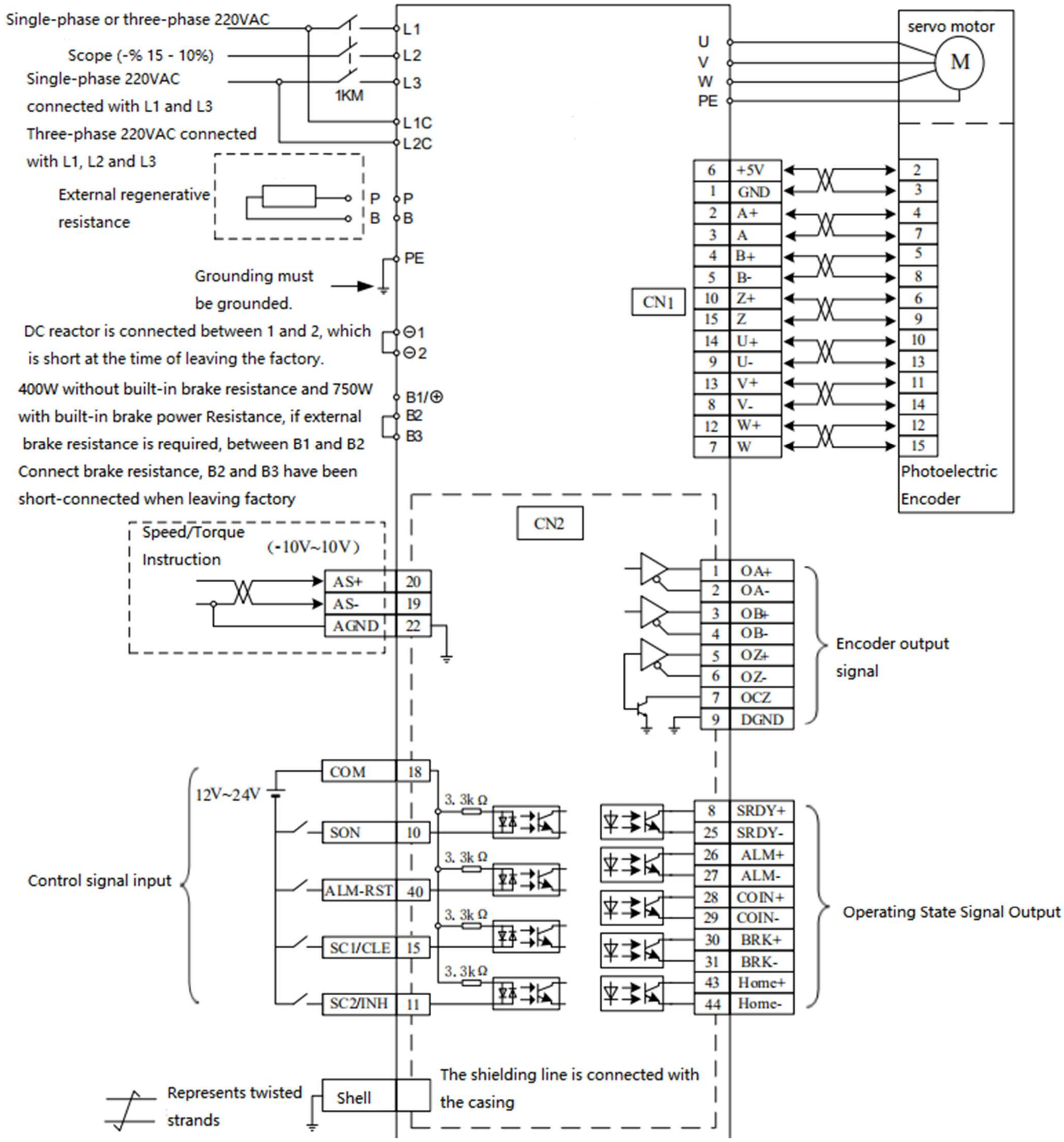

Single-phase or three-phase 220VAC
Scope (-% 15 - 10%)
Single-phase 220VAC connected with L1 and L3
Three-phase 220VAC connected with L1, L2 and L3
1KM
L1
L2
L3
L1C
L2C
External regenerative resistance
P
B
PE
Grounding must be grounded.
DC reactor is connected between 1 and 2, which is short at the time of leaving the factory.
⊖1
⊖2
400W without built-in brake resistance and 750W with built-in brake power Resistance, if external brake resistance is required, between B1 and B2 Connect brake resistance, B2 and B3 have been short-connected when leaving factory
B1/⊕
B2
B3
U
V
W
PE
servo motor
M
CN1
6 +5V
1 GND
2 A+
3 A
4 B+
5 B-
10 Z+
15 Z
14 U+
9 U-
13 V+
8 V-
12 W+
7 W
2
3
4
7
5
8
6
9
10
13
11
14
12
15
Photoelectric Encoder
CN2
Speed/Torque Instruction
(-10V~10V)
AS+ 20
AS- 19
AGND 22
1 OA+
2 OA-
3 OB+
4 OB-
5 OZ+
6 OZ-
7 OCZ
9 DGND
Encoder output signal
12V~24V
COM 18
SON 10
ALM-RST 40
SC1/CLE 15
SC2/INH 11
3. 3k Ω
3. 3k Ω
3. 3k Ω
3. 3kΩ
Control signal input
8 SRDY+
25 SRDY-
26 ALM+
27 ALM-
28 COIN+
29 COIN-
30 BRK+
31 BRK-
43 Home+
44 Home-
Operating State Signal Output
Represents twisted strands
Shell
The shielding line is connected with the casing

Figure 2-3-2: Speed/Torque Mode Wiring

2.2.2 Control signal input/output CN2

Control mode is abbreviated as: P stands for position control mode; S stands for speed control mode; T stands for torque control mode.

Terminal number	Signal name	Mark	Mode	Function
18	Input Common End	COM		The common end of the input terminal is used to drive the input optocoupler. It is connected to 0V or DC 12V-24V, and the current is more than 100mA.
10	Servo Enabling Input	SON		SON ON: Allows drives to work; SON OFF: The driver is closed and the motor is in free state. Note 1: Before calling SON from SON OFF to SON ON, The motor must be stationary. Note 2: After calling SON ON, wait for at least 50ms to enter the command.
40	Alarm clearance input	ALRS		ALRS ON: Clear system alarm; ALRS OFF: Keep system alarm. Note: The alarm with fault code greater than 8 can not be cleared by this method. It needs power off and maintenance, and then power on again.
15	Instruction pulse forbidden input	INH	P	INH ON: instruction pulse input is prohibited; INH OFF: instruction pulse input is valid.
	Speed Selection 1 Input	SC1	S	In the speed control mode, the combination of SC1 and SC2 is used to select different internal speeds. SC1 OFF, SC2 OFF: Internal speed 1 SC1 ON, SC2 OFF: Internal Speed 2 SC1 OFF, SC2 ON: Internal Speed 3 SC1 ON, SC2 ON: Internal Speed 4 Note: The values of internal velocities 1-4 can be modified by parameters.
11	Speed Selection 2 Input	SC2	S	
	Counter clearing	CLE	P	CLE ON: When position control, position deviation counter is cleared.
8	Servo ready output	SRDY+		SRDY ON: The control power supply and main power supply are normal, the driver does not alarm, the servo is ready to output ON (output on); SRDY OFF: The main power supply is not closed or the driver has an alarm. The servo is ready to output OFF (output cut-off).
25		SRDY-		
26	Alarm output	ALM+		ALM ON: Servo driver without alarm, output ON, output on; ALM OFF: Servo driver has alarm, output OFF, output cut-off.
27		ALM-		
28	Location completion output (position control mode); Velocity arrival transport Output (speed control mode);	COIN+	P	COIN ON: When the position deviation counter value is in the set positioning range, the positioning completes the output ON (output conduction), otherwise the output OFF (output cut-off). SCMP ON: When the speed reaches or exceeds the set speed, Speed reaches output ON (output on), otherwise output OFF (output cut-off).
29		COIN-	S	

Terminal number	Signal name	Mark	Mode	Function
30	Mechanical Brake Release Output	BRK+		This port can be used to control the brake when the motor has a mechanical brake (power-loss retainer). BRK ON: The brake transmitter is electrified, the brake is invalid, and the motor can run. BRK OFF: The brake is powered off, the brake is effective, the motor is locked and can not run. Note: The BRK function is controlled by the driver.
31		BRK-		
32	Instruction Pulse Position Input	PULS+	P	Determine the angle and speed of the motor.
33		PULS-		
34	Directional input of instruction pulse	SIGN+	P	Determine the rotation direction of the motor。
35		SIGN-		
20	Analog Speed Torque Instruction Input	AS+	S	Differential mode, the input impedance of 10 k Ω - 10 v ~ + 10 v input range
19		AS-	T	
22	simulation	AGND		Analog input ground wire
1	Encoder A Phase Signal Output	OA+		● ABZ differential drive output of encoder (26LS31 output, equivalent to RS422); ● Non-insulated output (non-insulated)
2		OA-		
3	Encoder B-phase signal output	OB+		
4		OB-		
5	Encoder Z-phase signal output	OZ+		
6		OZ-		
7	Encoder Z-phase collector open-circuit output	CZ		● In the upper computer, the Z-phase signal pulse is usually very narrow. Please use a high-speed optocoupler to receive it.
9	Encoder Ground Wire	GND		Encoder common ground wire

2.2.2 encoder signal input terminal CN1

Terminal number	Signal name	Mark	Mode
6	5V Power supply	+5V	Servo motor encoder with +5 power supply and common ground; When the cable is longer, multiple parallel connection should be used to reduce the line voltage drop。
1	Power common	0V	
2	Encoder A+ input	A+	It is connected with photoelectric encoder A+
3	Encoder A- input	A-	Connect with photoelectric encoder A-
4	Encoder B+ input	B+	Connected with photoelectric encoder B+
5	Encoder B- input	B-	Connected with photoelectric encoder B-
10	Encoder Z+ input	Z+	connected with the photoelectric encoder Z+
15	Encoder Z- input	Z-	Photoelectric encoder Z- phase connection
14	Encoder U+ input	U+	Photoelectric encoder U+ phase connection
9	Encoder U- input	U-	Photoelectric encoder U- phase connection
13	Encoder V+ input	V+	Photoelectric encoder V+ phase connection
8	Encoder V- input	V-	Photoelectric encoder V- phase connection
12	Encoder W+ input	W+	Photoelectric encoder W+ connected
7	Encoder W- input	W-	Connected with the photoelectric encoder W-
Shell	Frame Ground	FG	Shield ground terminal

Chapter 3 display and panel operation

3. 1 Panel shows

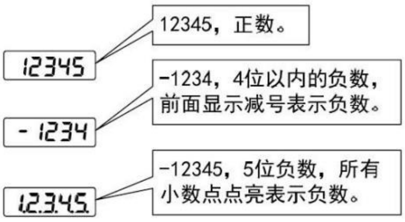
- The operating interface of the servo driver is composed of 5 LED digital tubes and 5 keys, which can be used for the state display and parameter setting of the servo driver. The interface layout is as follows:

Key function description

Button	Button name	Function
MODE	MODE	Switch the status monitoring mode/parameter mode/alarm mode and return to the previous menu.
▲	multiply	Add monitor code, parameter number or set value, long press can increase quickly.
▼	Reduce	Reduce the monitoring code, parameter number or set value, long press can quickly reduce.
◀◀	Shift	When setting parameters, press this key to move the selected flicker bit to the left by one.
SET	Confirm	Go to the next menu, or save the Settings.

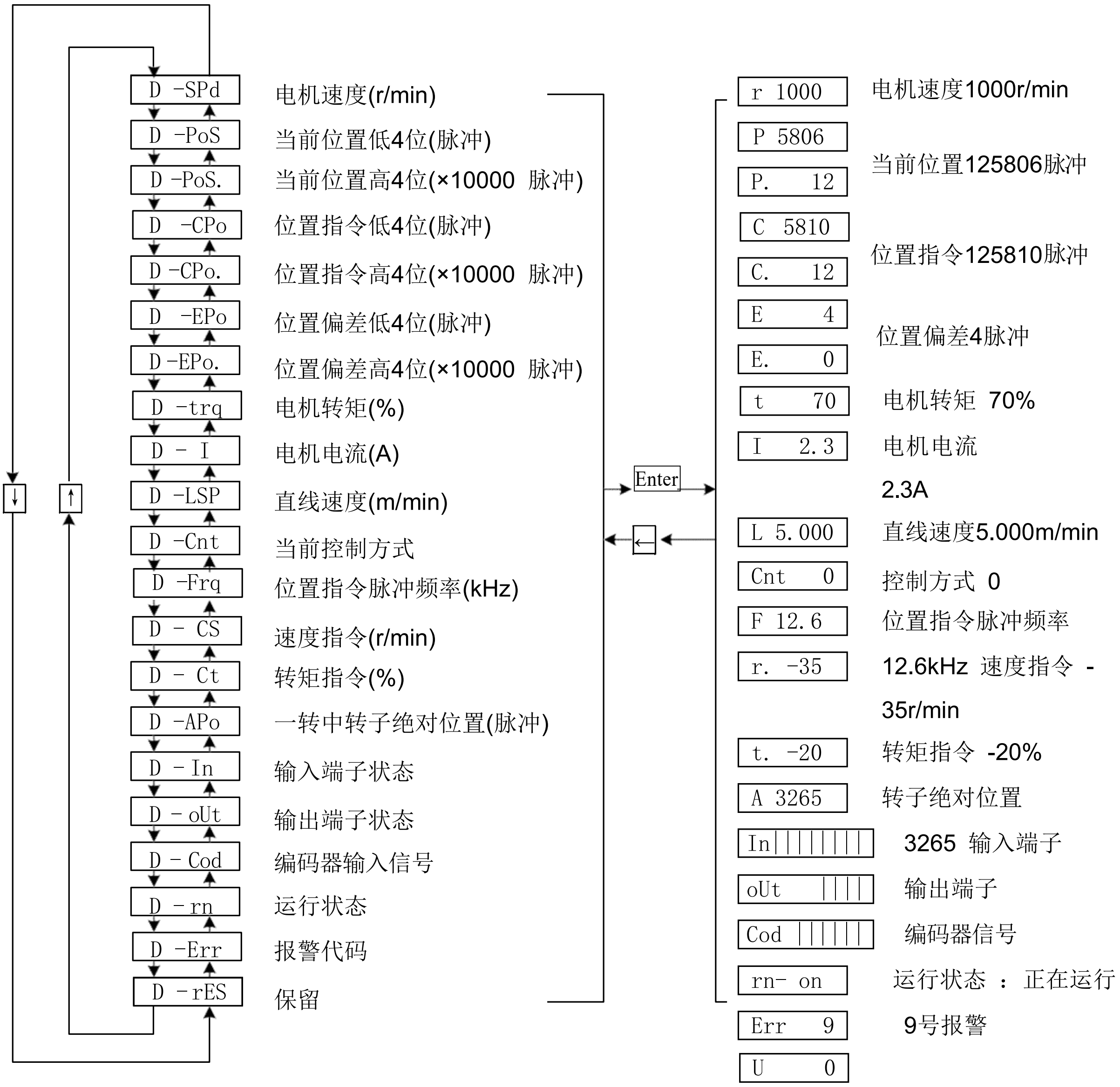
- Numerical indication

The numerical value USES 5 digital tube displays. The minus sign in front of the numerical value indicates a negative number. If it is a 5-digit negative number, all decimal points are lit to indicate a negative number. Some display items are preceded by an affix character, and if the number of digits is too long to occupy the position of the prefix character, the prefix character will not be displayed, only the value.


12345
12345，正数。
- 1234
-1234，4位以内的负数，前面显示减号表示负数。
1.2.3.4.5.
-12345，5位负数，所有小数点点亮表示负数。

3.2 state monitoring

When the servo driver is powered on, the display will display "Pr. On" for about one second, and then automatically enter the status monitoring mode. A total of 21 display state, the user with the, key to select the required display state. You can also change the value of P00.03 and select the display state of the display after the servo drive is powered on.


D -SPd
电机速度(r/min)
D -PoS
当前位置低4位(脉冲)
D -PoS.
当前位置高4位(×10000 脉冲)
D -CPo
位置指令低4位(脉冲)
D -CPo.
位置指令高4位(×10000 脉冲)
D -EPo
位置偏差低4位(脉冲)
D -EPo.
位置偏差高4位(×10000 脉冲)
D -trq
电机转矩(%)
D - I
电机电流(A)
D -LSP
直线速度(m/min)
D -Cnt
当前控制方式
D -Frq
位置指令脉冲频率(kHz)
D - CS
速度指令(r/min)
D - Ct
转矩指令(%)
D -APo
一转中转子绝对位置(脉冲)
D - In
输入端子状态
D - oUt
输出端子状态
D - Cod
编码器输入信号
D - rn
运行状态
D -Err
报警代码
D - rES
保留
↓
↑
Enter
←
r 1000
电机速度1000r/min
P 5806
P. 12
当前位置125806脉冲
C 5810
C. 12
位置指令125810脉冲
E 4
E. 0
位置偏差4脉冲
t 70
电机转矩 70%
I 2.3
电机电流 2.3A
L 5.000
直线速度5.000m/min
Cnt 0
控制方式 0
F 12.6
位置指令脉冲频率 12.6kHz
r. -35
速度指令 -35r/min
t. -20
转矩指令 -20%
A 3265
转子绝对位置 3265
In||||||||
输入端子
oUt ||||
输出端子
Cod ||||||
编码器信号
rn- on
运行状态 ：正在运行
Err 9
9号报警
U 0

3-2-1 Monitor mode operation block diagram [note 1] r 1000, r is the motor speed code, 1000 means the motor speed is anti-clockwise 1000r/min, if it is clockwise, negative speed -1000 will be displayed. The units are r/min.

[note 2] both position feedback pulse POS and position instruction pulse CPO are values amplified by input electronic gears. The motor encoder feedback position quantity is composed of POS. (high 4 bits) + POS (low 4 bits) :such as: P 12x1000=125806pcs pulse.

Similarly, the pulse amount of position instruction is also composed of CPO. (high 4 bits) + CPO (low 4 bits),Such as C. 12x10000+C5810=125810pcs pulse

When the encoder is fixed, the Z pulse is fixed as the zero pulse position. D-apo display motor encoder The pulse value of the output position signal deviating from the zero pulse. If the number of lines of the encoder is 2500, the display range is 0~9999.

[note 4] the display of input terminal is shown in figure 3-2-2, the display of output terminal is shown in figure 3-2-3, and the display of encoder signal is shown in figure 6-5

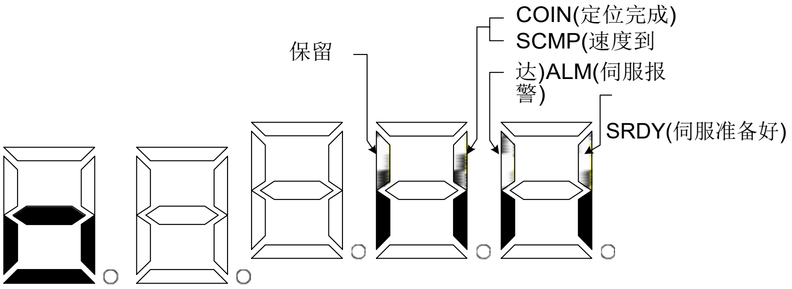
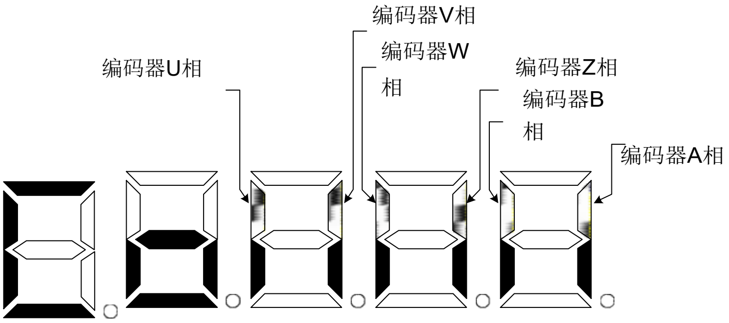


图 3-2-3 输出端子显示(笔划点亮表示 ON，熄灭表示 OFF)



3-2-4 Encoder signal display (stroke ON means ON, OFF means OFF)

【Note 5】 running state is denoted as：

rn- oF ：The main circuit is not charged and the servo system is not running；

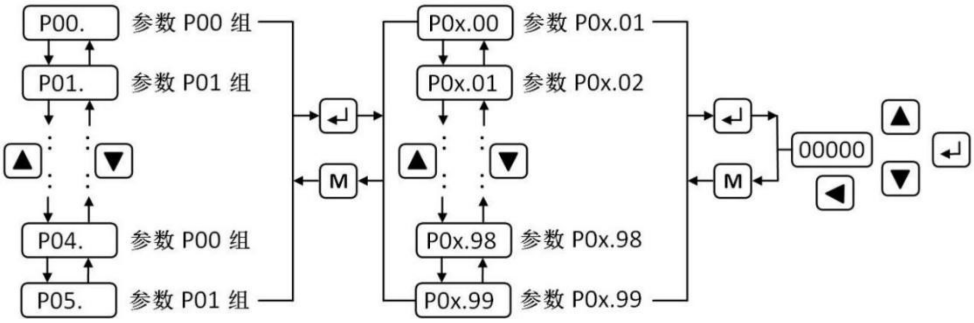
rn- CH ：The main circuit has been charged, and the servo system is not running (the servo system does not enable or alarm exists).

rn- on ：The main circuit is charged and the servo system is running

3.2 Parameter setting

In the menu of the first layer, press [MODE] key to switch to P00. then use Parameter setting mode, and then use 【▲】、【▼】 button select different parameter groups P00~P05.

Press [SET] key to enter the second layer "parameter number" menu, and use【▲】and【▼】 keys to select different parameter Numbers. Press "SET" key to display the parameter values, the parameter value of lowest twinkle, twinkle with "◂" button can be moved, with the【▲】or 【▼】 key can modify the parameter values. Press [SET] key to save the modified value, which will be immediately reflected into the control. After that, press【▲】and 【▼】 button to continue to modify the parameters. After the modification, press [MODE] button to return to the parameter selection menu. If you are not satisfied with the value being modified, do not press the [SET] key to confirm. You can press the [MODE] button to cancel, restore the original value of the parameter, and return to the parameter selection menu.



3-3-1 Parameter setting operation block diagram

➢ Restore parameter default value operation

The operation steps are as follows:

1. Change the password parameter P00.00 to 385, i.e. P00.00 =385.
2. Search the motor model code corresponding to the current motor according to appendix A, and input the motor model code into the parameter P00.01.
3. Modify the parameter P03.07 to 1, and press [SET] key to restore the default value of the motor. Then power on again, using the default parameters of the motor.

Chapter 4 parameters and functions

4.1 list of parameters

The factory values in the following table take the servo driver of 110sjt-m02030 (2N•m, 3000r/min) motor as an example. Relevant parameters of different motors are different。

P00 Parameters

Parameters No	Name	Setting rage	factory default	Unit	Application way
P00.00	Password	0～9999	315		P，S
P00.01	Motor model code	0～69	60*		P，S
P00.02	Software version (read only)	*	*		P，S
P00.03	Initial display state	0～20	0		P，S
P00.04	Control Strategy Choice	0～8	0		P，S
P00.05	Velocity proportional gain	5～2000	150*	Hz	P，S
P00.06	Velocity integral time constant	1～1000	80*		P，S
P00.07	Torque command filter	1～500	30	%	P，S
P00.08	Speed detection low pass filter	1～500	120	%	P，S
P00.09	Position proportional gain	1～1000	50	1/s	P
P00.10	Position feed forward gain	0～100	0	%	P
P00.11	Position feed forward low pass filter cutoff frequency	1～1200	300	Hz	P
P00.12	Position command pulse frequency divider molecule	1～32767	10000		P
P00.13	Position order pulse frequency divider denominator	1～32767	1000		P
P00.14	Position instruction pulse input mode	0～1	0		P
P00.15	Reverse the direction of the position command pulse	0～1	0		P
P00.16	Positioning completion range	0～30000	20	Pulse	P
P00.17	Location out of tolerance detection range	0～30000	200	×100 Pulse	P
P00.18	Location error not valid	0～1	0		P
P00.19	Position order smoothing filter	0～30000	100*	0.1ms	P

P01 Parameters

Parameters No	Name	Setting rage	factory default	Unit	Application way
P01.00	Invalid driver forbidden input	0～1	0		P，S
P01.01	JOG operating speed	-3000～3000	120	r/min	S
P01.02	Acceleration and deceleration time constant	1～10000	500*	ms	S
P01.03	Maximum speed limit	0～6000	3600	r/min	P，S
P01.04	Internal velocity 1	-3000～3000	0	r/min	S
P01.05	Internal velocity 2	-3000～3000	100	r/min	S
P01.06	Internal velocity 3	-3000～3000	300	r/min	S
P01.07	Internal velocity 4	-3000～3000	-100	r/min	S
P01.08	Reach the speed	0～3000	500	r/min	S
P01.09	reserve				
P01.10	Internal CCW torque limitation	0～300	300*	%	P，S
P01.11	Internal CW torque limits	-300～0	-300*	%	P，S
P01.12	External CCW torque limit	0～300	100	%	P，S
P01.13	External CW torque limits	-300～0	-100	%	P，S
P01.14	Speed trial operation, JOG operation torque limit	0～300	100	%	S
P01.15	reserve				

P02 Parameters

Parameters No	Name	Setting rage	factory default	Unit	Application way
P02.00	Analog speed command gain	10～3000	300	r/min/V	S
P02.01	Reverse direction of analog speed command	0～1	0		S
P02.02	Analog speed command zero offset compensation	-500～500	0		S
P02.03	Analog speed command has no control action area	-500～500	0		S
P02.04	Analog speed command filter	1～1000	300	Hz	S
P02.05	Analog torque command gain	1～300	30	%/V	T
P02.06	Reverse direction of analog torque instruction	0～1	0		T
P02.07	Analog torque instruction zero offset compensation	-500～500	0		T
P02.08	Maximum speed limit for torque control	0～4000	2500	r/min	T
P02.09	Analog torque command filter	1～1000	300	Hz	T
P02.10	The lower 4-bit input terminal enforces the ON control word	0～15	0		ALL
P02.11	High 4 bit input terminal force ON control word	0～15	0		ALL
P02.12	Reverse control word for lower 4 bit input terminal	0～15	0		ALL
P02.13	Reverse control word for high 4 bit input terminal	0～15	0		ALL
P02.14	Reverse control word for output terminal	0～15	0		ALL
P02.15	Input terminal to dither the time constant	1～1000	16	0.1ms	ALL

P03 Parameters

Parameters No	Name	Setting rage	factory default	Unit	Application way
P03.00	Speed trial run	0～1	0		S
P03.01	JOG Run	0～1	0		S
P03.02	Encoder zero operation	0～1	0		ALL
P03.03	Open loop operation	0～1	0		ALL
P03.04	The initial detection point of software overcurrent	30～100	90	%	ALL
P03.05	Software overcurrent detection time	10～10000	300	0.1ms	ALL
P03.06	SON servo actuation	0～1	1		ALL
P03.07	System parameters initialized	0～1	0		ALL

4.1.1 Parameters function

Parameters No	Name	Function	parameter scope
P00.00	Password	①Used to prevent parameters from being modified by mistake. In general, when you need to set parameters, first set this parameter to the required password, and then set parameters. After debugging, set this parameter to 0 at last to ensure that the parameter will not be modified by mistake in the future. ②Password classification, corresponding to user parameters, system parameters and all parameters. ③Change the motor model code parameter (P00.01) must use the model code password, other passwords cannot change this parameter. ④User password is 315, model code password is 385.	0～9999
P00.01	Motor model code	①Corresponding to the same series of different power levels of servo drivers and motors ②The parameter default values of different motor model codes are different. When restoring the default parameter function, the correctness of this parameter must be guaranteed. ③When EEPROM alarm (no. 20) appears, it must reset this parameter after repairing, and then restore the default parameter. Otherwise, the servo drive will not work properly or damage. ④When changing this parameter, set the password (P00.00 parameter) to 385 before changing this parameter. ⑤See this chapter for the detailed meaning of the parameters	0～69
P00.02	software version	You can view the software version number, but you can't change it.	*
P00.03	Initial display state	Select the display status of the display after the servo driver is powered on. 0: Display motor speed; 1: Display the current position 5 bits lower; 2: Display the current position 5 bits high; 3: Display position instruction (instruction pulse accumulation) is 5 bits lower; 4: Display position instruction (instruction pulse accumulation) is 5 bits high; 5: Display position deviation is 5 bits lower; 6: Display position deviation is 5 bits higher; 7: Display motor torque; 8: Display motor current; 9: Display linear velocity; 10: Display control mode; 11: Display position instruction pulse frequency; 12: Display speed instructions; 13: Display the Torque Instruction; 14: Display the absolute position of the rotor in one turn. 15: Display input terminal status; 16: Display output terminal status; 17: Display input signal of encoder; 18: Display the running status; 19: Display alarm code; 20: Reserve.	0～20

4.1.2 **P00** Parameters

Parameters No	Name	Function	parameter scope
P00.04	Control Strategy Choice	Through this parameter, the control mode of AC servo drive unit can be set: 0: position control mode; 1: Speed control mode; 2: Trial operation control mode; 3: JOG control mode; 4: Zero-adjusting mode of encoder; 5: Open-loop operation mode (for testing motor and encoder); 6: External analog speed control mode; 7: External analog torque control mode. (2) Position control mode, the position instruction is input from the pulse input port. (3) Speed control mode. Speed instructions are input from input terminals. The combination of SC1 and SC2 is used to select different internal speeds. SC1 OFF, SC2 OFF: Internal Speed 1 SC1 ON, SC2 OFF: Internal Speed 2 SC1 OFF, SC2 ON: Internal Speed 3 SC1 ON, SC2 ON: Internal Speed 4 (4) Trial operation control mode, speed instruction input from keyboard, used to test AC servo drive unit and motor. _JOG control mode, that is, point-to-move mode, after entering JOG operation, press_key and keep it. The motor operates at JOG speed, loosen key, stop the motor and keep zero speed; press_key and keep it, the motor operates at JOG speed in reverse, loosen key, stop the motor and keep zero speed. _Zero-adjusting mode of encoder, used to adjust the zero point of encoder disc when the motor leaves the factory.	0～8
P00.05	Velocity proportional gain	（1）set the proportional gain of the speed loop regulator. (2) The larger the setting value, the higher the gain, and the greater the stiffness. The parameters are determined according to the type and load of the servo driver. In general, the greater the load inertia, the larger the set value. (3) Under the condition that the system does not produce oscillation, it should be set as large as possible.	5～2000Hz
P00.06	Velocity integral time constant	(1)Set the integral time constant of the speed loop regulator. (2) The smaller the setting value, the faster the integration speed and the greater the stiffness. The parameters are determined according to the type and load of the servo driver. In general, the greater the inertia of load, the smaller the set value. (3) Under the condition that the system does not produce oscillation, the system should be set as small as possible.	1 ～1000ms

P00.07	Torque command filter	(1) Setting the characteristics of the torque instruction filter. It can suppress the resonance caused by the torque (the motor emits sharp vibration noise). If the motor emits sharp vibration noise, please reduce this parameter. (3) The smaller the value, the lower the cut-off frequency, and the smaller the noise generated by the motor. If the load inertia is large, the setting value can be reduced appropriately. Too small a value will slow down the response and may cause instability. (4) The larger the numerical value, the higher the cut-off frequency and the faster the response. If higher Mechanical rigidity can be increased appropriately.	1～500%

Parameters No	Name	Function	parameter scope
P00.08	Speed detection low pass filter	①Set the speed detection low pass filter characteristics ②The smaller the value, the lower the cut-off frequency, the lower the noise generated by the motor. If the load inertia is large, the set value can be appropriately reduced. The value is too small, causing the response to slow down and may cause oscillation. ③The higher the value is, the higher the cutoff frequency is, and the faster the speed feedback response is. If you need For a higher speed response, increase the set point appropriately.	1～500%
P00.09	Position proportional gain	①Set the proportional gain of the position ring regulator. ②The larger the setting value is, the higher the gain will be, and the greater the stiffness will be. Under the condition of the same frequency instruction pulse, the smaller the position hysteresis will be. However, too large a value may cause oscillation or overshoot. ③The parameter value is determined according to the specific servo driver model and load condition.	1～1000 /s
P00.10	Position feedforward gain	①Set the feed-forward gain of the position loop. ②When set to 100%, it means that the position hysteresis is always 0 under the instruction pulse of any frequency. ③When the feed-forward gain of the position loop is increased, the high-speed response characteristics of the control system are improved, but the position loop of the system is unstable and prone to oscillation. ④Unless very high response characteristics are required, the feedforward gain of the position loop is usually 0.	0～100％
P00.11	Position feed-forward low Through filter cutoff frequency	①Set the cut-off frequency of the low pass filter for the position loop feedforward. ②The function of this filter is to increase the stability of compound position control.	1～1200Hz
P00.12	Position command pulse frequency divider molecule	①Set the frequency division of the position instruction pulse (electronic gear). ②In the position control mode, by setting no. 12 parameter and no. 13 parameter, it can be easily matched with various pulse sources to achieve the ideal control resolution (i.e., Angle/pulse) of users. ③ $P \times G = N \times C \times 4$ P：number of pulses of input instruction； G：electronic gear ratio； $G = \frac{\text{Frequency division of molecular}}{\text{Dividing the denominator}}$ N：Number of revolutions of the motor； C：Photoelectric encoder line number/turn, the system C＝2500。 ④ex：When the input instruction pulse is 6000, the servo motor rotates 1 turn $G = \frac{N \times C \times 4}{P} = \frac{1 \times 2500 \times 4}{6000} = \frac{5}{3}$ Parameter 12 is set to 5, and parameter 13 is set to 3。 ⑤The recommended range of electronic gear ratio： $\frac{1}{50} \le G \le 50$	1～32767
P00.13	Position instruction pulse Impulse frequency denominator	See parameter 12	1～32767
P00.14	Position instruction pulse input mode	①Set the input form of the position instruction pulse. ②The parameter is set to one of two input modes： 0： Pulse+ sign； 1：Two phase A/B orthogonal pulses;	0～1

Parameters No	Name	Function	parameter scope
P00.15	Reverse the direction of the position command pulse	①Set as 0: normal; 1：Reverse direction of position command pulse.	0～1
P00.16	Positioning completion range	①Set the pulse range of positioning completion under position control. ②This parameter provides the basis for the servo driver to judge whether the positioning is completed or not under the position control mode. When the number of remaining pulses in the position deviation counter is less than or equal to the set value of this parameter, the servo driver thinks that the positioning has been completed, and the positioning signal is COIN ON, otherwise COIN OFF. ③In the position control mode, the positioning signal is output to complete COIN; in other control modes, the output speed reaches the signal SCMP. ④Set the pulse range of positioning completion under position control. ⑤This parameter provides the basis for the servo driver to judge whether the positioning is completed or not under the position control mode. When the number of remaining pulses in the position deviation counter is less than or equal to the set value of this parameter, the servo driver thinks that the positioning has been completed, and the positioning signal is COIN ON, otherwise COIN OFF. ⑥In the position control mode, the positioning signal is output to complete COIN control in other states In the system mode, the output speed reaches the signal SCMP.	0～ 30000 Pulse
P00.17	Location out of tolerance detection range	①Set the location out-of-tolerance alarm detection range ②In the position control mode, when the value of the position deviation counter exceeds the value of this parameter, the servo driver will give the position deviation alarm.	0～30000 ×100 Pulse
P00.18	Location error not valid	①Setup: 0：Location out of tolerance alarm detection is effective 1Position out of tolerance alarm detection is invalid, stop detection position out of tolerance error.	0～1

P00.19	Position order smoothing filter	①The command pulse is smoothed and filtered with exponential acceleration and deceleration, and the numerical value represents the time constant. ②The filter does not lose input pulse, but instruction delay occurs. ③This filter is used for: ● The upper controller has no acceleration and deceleration function; ● Electronic gear division frequency larger（>10；） ● Instruction frequency is low； ● Stepping jump and unsteady phenomenon appear in motor operation。 ④When set to 0, the filter does not work。	0～30000 ×0.1ms

4.1.3 **P01** Parameters

Parameters No	Name	Function	parameter scope
P01.00	Invalid driver forbidden input	①Setup: 0：CCW and CW input forbidden valid. CCW driver is allowed when FSTP is ON. When CCW drive OFF switch (FSTP), CCW directional torque remains at 0; The CW in the same way. If both CCW and CW drivers are OFF, an error alarm will be generated to disable the driver input. 1：Cancel CCW and CW input prohibition. CCW and CW drivers are allowed regardless of the status of CCW and CW drivers. At the same time, if both CCW and CW drivers are OFF, there will be no error alarm of driver forbidden input	0～1

Parameters No	Name	Function	parameter scope
P01.01	JOG Running speed	①Set the running speed of JOG operation.	-3000～3000 r/min
P01.02	Acceleration and deceleration time constant	①The setting value is the acceleration time of the motor from 0 to 1000 r/min ②The acceleration and deceleration characteristics are linear ③For speed control only, position control is invalid ④This parameter should be set to 0 if the servo driver is used in combination with an external position ring	1～10000ms
P01.03	Maximum speed limit	①Set the maximum speed limit of the servo motor ②It has nothing to do with the direction of rotation. ③If the setting value exceeds the rated speed, the actual maximum speed limit is the rated speed	0～6000 r/min
P01.04	Internal speed 1	①Set internal speed 1. ②In the speed control mode, when SC1 is OFF and SC2 is OFF, the internal speed 1 is selected as the speed instruction.	-3000～3000 r/min
P01.05	Internal speed 2	①Set internal speed 2 ②In the speed control mode, when SC1 is ON and SC2 is OFF, the internal speed 2 is selected as the speed instruction.	-3000～3000 r/min
P01.06	Internal speed 3	①Set internal speed 3. ②In the speed control mode, when SC1 is OFF and SC2 is ON, select internal speed 3 as the speed instruction.	-3000～3000 r/min
P01.07	Internal speed 4	①Set internal speed 4. ②In the speed control mode, when SC1 is ON and SC2 is ON, select internal speed 4 as the speed instruction.	-3000～3000 r/min
P01.08	Reach the speed	①Set arrival speed ②In the non-position control mode, if the motor speed exceeds the set value, SCMP ON, otherwise SCMP OFF. ③In position control mode, this parameter is not used ④It has nothing to do with the direction of rotation ⑤The comparator has hysteresis characteristics	0～3000 r/min
P01.10	Internal CCW The torque limit	①Set internal torque limit value of servo motor CCW direction. ②The setting value is the percentage of the rated torque, for example 2 of the rated torque X, set the value to 200. ③This restriction is valid at all times. ④If the set value exceeds the maximum allowable overload capacity of the system, the actual torque is limited to the maximum allowable overload capacity of the system.	0～300%
P01.11	Internal CW torque limits	①Set internal torque limit value of CW direction servo motor. ②The setting value is the percentage of the rated torque, for example 2 of the rated torque X, the value is set to -200 ③This restriction is valid at all times. ④If the set value exceeds the maximum allowable overload capacity of the system, the actual torque is limited to the maximum allowable overload capacity of the system.	-300%～0

P01.12	External CW torque limits	①Set the external torque limit value of the servo motor in CCW direction. ②The setting value is the percentage of the rated torque, for example 1 of the rated torque X, the value is set to 100 ③This limitation is only valid if the CCW torque limiting input terminal (FIL) ON. ④When the limit is effective, the actual torque limit is the minimum of the maximum allowable overload capacity of the system, internal CCW torque limit and external CCW torque limit.	0～300%
P01.13	External CW torque limits	①Set the external torque limit value of the CW direction servo motor. ②The setting value is the percentage of the rated torque, for example 1 of the rated torque the value is set to -100. ③This restriction is only valid if the CW torque limit input terminal (RIL) ON. ④When the limit is effective, the actual torque limit is the minimum absolute value of the maximum allowable overload capacity of the system, internal CW torque limit and external CW torque limit	-300%～0
P01.14	Speed trial operation, JOG operation torque limit	①Set the torque limit value in the speed trial operation and JOG operation mode. ②It has nothing to do with the direction of rotation. ③The setting value is the percentage of the rated torque, for example 1 of the rated torque X, the value is set to 100. ④Internal and external torque limits are still valid.	0～300%

4.1.4 **P02** Parameters

Parameters No	Name	Function	parameter scope
P02.00	Analog speed command gain	①Set the ratio between the input voltage of the analog speed and the actual running speed of the motor. ②The analog input range is -10~10V	10～3000
P02.01	Reverse direction of analog speed command	③Polarity reversal of analog velocity input. ④When set to 0, the analog speed instruction is positive, and the velocity direction is CCW; When set to 1, the analog speed instruction is positive, and the speed direction is CW;	0～1
P02.02	Analog velocity indicator Let zero offset compensation	Zero offset compensation for analog velocity input.	-500～500
P02.03	Analog speed command uncontrolled Use area	The command force is 0 when the analog speed input voltage is in the no-control area.	-500～500
P02.04	Analog speed command filter	①A low pass filter for analog velocity input. ②The larger the setting value is, the faster the response speed to the speed input analog quantity will be, and the greater the influence of signal noise will be. The smaller the setting value, the slower the response and the smaller the influence of signal noise.	1～1000
P02.05	Analog torque command gain	①Set the proportional relationship between the input voltage of the analog torque and the actual running torque of the motor. The unit of set value is 1%/V; ②The analog input range is -10~10V.	1～300
P02.06	Reverse direction of analog torque instruction	①Polarity reversal of analog torque input. ②When set to 0, analog torque instruction is positive, and torque direction is CCW; When set to 1, the analog torque instruction is positive, and the direction of torque is CW;	0～1

Parameters No	Name	Function	parameter scope
P02.07	Analog torque instruction zero offset compensation	Zero offset compensation for analog torque input.	-500～500
P02.08	Maximum speed limit for torque control system	①In torque control, the motor speed is limited within this parameter; ②It can prevent overspeed under light load	0～4000
P02.09	Analog torque command filter	①Low pass filter for analog torque input. ②The larger the setting value is, the faster the response speed to torque input analog quantity is, and the greater the influence of signal noise is. The smaller the setting value, the slower the response and the smaller the influence of signal noise.	1～1000
P02.10	The ON control word is forced ON the lower 4 bit input terminal	①Set input terminal internal force ON valid. The terminals that are not mandatory ON need to be controlled ON/OFF in the external connection. The terminals that are mandatory ON do not need to be connected in the external connection, and the internal drive is automatically set ON; ②It is represented by a 4-bit binary number, 0 means the corresponding input terminal is not mandatory ON, and 1 means the corresponding input terminal is mandatory ON. The input terminal represented by the binary number is as follows: 0：SON Servo-on； 1：ALRS Alarm clearance； 2：FSTP CCW Driving ban； 3：RSTP CW Driving ban。	0～15
P02.11	The high 4 bit input is forced ON control word	①Set input terminal internal force ON valid. The terminals that are not mandatory ON need to be controlled ON/OFF in the external connection. The terminals that are mandatory ON do not need to be connected in the external connection, and the internal drive is automatically set ON; ②The 4-bit binary number indicates that 0 indicates that the corresponding input terminal is not mandatory ON, and 1 indicates that the corresponding input terminal is mandatory ON. The input terminal represented by a binary number is shown below： 0：CLE/SC1 Deviation counter reset/speed selection1； 1：INH/SC2 Command pulse disable/speed select 2； 2：FILCCW Torque limitation； 3：RILCW torque limitation。	0～15
P02.12	Reverse control word for lower 4 bit input terminal	①Set input terminal to invert. If the reverse terminal is not taken, it is effective when the switch is closed and invalid when the switch is disconnected. If the reverse terminal is taken, it is invalid when the switch is closed and valid when the switch is disconnected ②It is represented by a 4-bit binary number, 0 means the corresponding input terminal is not inverted, and 1 means the corresponding input terminal is inverted. The input terminal represented by a binary number is shown below 0：SON Servo-on； 1：ALRS Alarm clearance； 2：FSTP CCW Driving ban； 3：RSTP CW Driving ban。	0～15
P02.13	High 4 bit input terminal reverse control Making the word	①Set input terminal to invert. If the reverse terminal is not taken, it is effective when the switch is closed and invalid when the switch is disconnected. If the reverse terminal is taken, it is invalid when the switch is closed and valid when the switch is disconnected.	0～15

Parameters No	Name	Function	parameter scope
P02.13	Reverse control word for high 4 bit input terminal	②It is represented by a 4-bit binary number, 0 means the corresponding input terminal is not inverted, and 1 means the corresponding input terminal is inverted. The input terminal represented by a binary number is shown below: 0：CLE/SC1 Deviation counter reset/speed selection 1； 1：INH/SC2 Command pulse disable/speed select2； 2：FIL CCW Torque limitation； 3：RIL CW Torque limitation。	0～15
P02.14	Reverse control word for output terminal	①Set the output terminal to invert. The definition of the reverse terminal, on and off is exactly the opposite of the standard definition; ②It is represented by a 4-bit binary number, 0 means the corresponding output terminal is not inverted, and 1 means the corresponding output terminal is inverted. The output terminal represented by binary number is as follows: 0：SRDY servo -ready； 1：ALM servo alarm； 2：COIN Position completed/speed reached； 3：BRK Mechanical brake release。	0～15
P02.15	Input terminal to dither the time constant	The input terminal to the jitter filtering time. The smaller the value, the faster the terminal input response; The larger the value, the better the anti-interference performance of terminal input, but the slower the response.	1～1000

4.1.5 **P03** Parameters

Parameters No	Name	Function	parameter scope
P03.00	Speed trial run	SET the value to 1, and press the SET key to enter the speed trial operation mode. The speed instruction is SET by the key	0～1
P03.01	JOG running	SET the value to 1, and press the SET key and then JOG operation mode. The speed instruction is SET by pressing the key。	0～1
P03.02	Speed trial run	The zero adjustment function of the encoder is used by the motor manufacturer.	0～1
P03.03	Open loop Run	The open-loop operation mode is used by the motor manufacturer	0～1
P03.04	The initial detection point of software overcurrent	①Set the initial detection point of software overcurrent; ②The setting value is the percentage of the system's maximum current	30～100
P03.05	Software overcurrent detection time	①Software overcurrent detection time, unit 0.1 ms; ②Set to 0, the software overcurrent alarm function is forbidden; Normally, this parameter is set to 0.	10～10000
P03.06	SON Servo force enable	①When set to 0, SON is determined by IO port input signal; ②When set to 1, SON will be forced to be ON (independent of IO port input signal).	0～1
P03.07	System parameters initialized	①Set the value to 1 to restore all parameters to their default (factory value). Since the default values of the parameters for different drivers and motor models are different, the correctness of the motor model code (parameter P00.01) must be guaranteed before restoring the default parameters. ②When changing this parameter, set the password (P00.00 parameter) to 385 before changing this parameter	0～1

Chapter 5 alarm and handling

5.1 alarm list

Servo driver has a variety of protection functions, after power detected fault, servo driver will stop motor operation, operation Display the alarm code er-xx on the panel. You can go in **d-Err** Menu to view the current alarm code. Users can report according to the report
Refer to the relevant content of this chapter for the cause of the failure and troubleshooting

5-1 alarm list

alarm code	Alarm name	Content
--	Normal	
1	Over speed	servo motor speed exceeds the set value
2	Main circuit over voltage	main circuit supply voltage is too high
3	main circuit under voltage	Main circuit power supply voltage is too low
4	Position error	position deviation counter exceeds the set value
5	Motor overheating	Motor temperature is too high
6	Speed amplifier saturation failure	speed regulator saturates for a long time
7	Driver disable exception	CCW and CW drive are OFF
8	Position deviation counter overflow	absolute value of the position deviation counter is greater than 2^{30}
9	Encoder failed	Encoder signal error
10	Control under voltage of power supply	Control power supply 15V is low
11	IPM module failure	IPM Intelligent module fault
12	Over current	Excessive motor current
13	overload	Ac servo drive unit and motor overload (instantaneous overheating)
14	Braking fault	Brake circuit fault
15	Encoder count error	Encoder count exception
16	Motor thermal overload	Electrical and mechanical heating value exceeds the set value (I2t test)
19	Thermal reduction	system was reset by heat
20	EEPROM error	EEPROM error
23	IU,IV Current sampling anomaly	IU,IV Current sampling anomaly
30	encoder Z pulse is lost	Encoder Z pulse error
31	Encoder UVW signal error	Encoder UVW signal error or mismatch with encoder
32	Illegal encoder UVW signal encoding	UVW signals exist at all high or all low levels

5.1 alarm processing method

5-2 Alarm handling method

Alarm Code	Alarm name	Running status	Reasons	Handling method
1	Over speed	Appears when switching on the control power	Control board fault。	Replace the servo driver
			Motor encoder failure。	Replace the servo motor
		Motor appears during operation	Input instruction pulse frequency is too high。	Set the input instruction pulse correctly.
			The acceleration/deceleration time constant is too small, so that the speed overshoot is too large	Increase the acceleration/deceleration time constant.

Alarm Code	Alarm name	Running status	Reasons	Handling method
1	Over speed	Motor appears during operation	Input electronic gear ratio too large.	Set it up correctly.
			Motor encoder failure	Replace the servo motor.
			Bad encoder cable.	Change encoder cable.
			servo system is unstable, causing overshoot.	①Reset about gain. ②If the gain cannot be set to an appropriate value, the load inertia ratio is reduced.
		The motor appears as soon as it starts	Load inertia is too large.	①Reduce the load inertia. ②Replace high power servo drivers and motors
			Encoder zero error.	①Replace the servo motor. ②Please reset the encoder zero
			①Wrong connection of U, V and W leads of motors. ②Wrong lead of encoder cable	Correct wiring.
2	Main circuit overvoltage	Appears when switching on the control power	Circuit board failure.	Replace the servo driver.
		Appears when the main power is switched on	①The power supply voltage is too high. ②Power supply voltage waveform is abnormal.	Check the power supply
		Motor appears during operation	Brake resistance wire is disconnected	rewiring
			①Brake transistor is damaged. ②Internal brake resistance is damaged.	Replace the servo driver.
			Insufficient capacity of brake circuit.	①Reduce start and stop frequency. ②Increase the acceleration/deceleration time constant. ③Reduce the torque limit. ④Reduce the load inertia. ⑤Replace high power servo drivers and motors
3	main circuit undervoltage	Appears when the main power is switched on	①Circuit board failure. ②power supply is insured against damage. ③Soft start circuit failure. ④The rectifier is damaged.	Replace the servo driver.
		Appears when the main power is switched on	①Circuit board failure. ②The power supply is insured against damage. ③Soft start circuit failure. ④The rectifier is damaged.	Replace the servo driver.
			①The power supply is low. ②Temporary power failure more than 20mS。	Check the power supply
		Motor appears during operation	①Insufficient power supply. ②Instantaneous power loss.	Check the power supply
			Heatsink is overheating.	Check the load.
4	Position error	Appears when switching on the control power	Circuit board failure.	Replace the servo driver.

Alarm Code	Alarm name	Running status	Reasons	Handling method
4	Position error	Switch on the main power supply and control line, input instruction pulse, motor does not rotate	①Wrong connection of U, V and W leads of motors ②Wrong lead of encoder cable.	Correct connection
			Encoder failed	Replace the servo motor.
			The detection range of setting position deviation is too small.	Increase the detection range of out-of-tolerance position.
			Position proportional gain is too small.	Increase gain.
			Insufficient torque.	①Check the torque limit. ②Reduce the load capacity. ③Replace high power servo drivers and motors。
			Command pulse frequency too high.	reduce frequency
5	Motor overheating	Appears when switching on the control power	Circuit board failure.	Replace the servo motor driver.
			① cable is broken. ②Motor internal temperature relay damaged	①Check the cables. ②Check the Motor.
		Motor appears during operation	Motor overload.	①Reduce the load. ②Reduce start and stop frequency. ③Reduce the torque limit. ④Reduce the relevant gain. ⑤Replace high power ac servo drive unit and motor
			Motor internal fault.	Replace the servo motor.
6	Speed amplifier saturation failure	Motor appears during operation	motor jammed mechanically.	Check the mechanical part of the load.
			Over load	①Reduce the load ②Replace high power servo drivers and motors.
7	Driver disable exception		CCW, CW drive forbidden input terminal Disconnect.。	Check wiring and power supply for input terminals.
8	Position deviation counter overflow		① motor jammed mechanically. ②Abnormal input instruction pulse	①Check the mechanical part of the load. ②Check the command pulse. ③Check whether the motor receives the instruction pulse to rotate.
9	Encoder Failed		Encoder wiring error.	Check wiring
			encoder is damaged.	Replace the servo motor.
			Bad encoder cable	Change cable
			The encoder cable is too long, resulting in low power supply voltage of the encoder.	①Shorten the cable.。 ②Multi-core parallel power supply is adopted。
10	Control under voltage of power supply		Input control internal 15V voltage is low	Check the control power。
			①Bad internal connector of servo driver. ③Abnormal switching power supply. ③Chip is damaged.	①Replace the servo motor driver. ②Check the connectors. ③Check the switching power supply.

Alarm Code	Alarm name	Running status	Reasons	Handling method
11	IPM module failure	Appears when switching on the control power	Circuit board failure.	Replace the servo motor driver.
		Motor appears during operation	①Low supply voltage. ②Overheating	①check the servo motor driver. ②power-on again ③Replace the servo driver.
			Short circuit between servo driver U, V and W	Check the wiring
			Bad grounding.	Correct grounding.
			Motor insulation damage	Replace the servo motor
			be disturbed	①Add line filters. ②Stay away from distractions
12	Over current		Short circuit between servo driver U, V and W	Check the wiring
			Bad grounding.	Correct grounding.
			Motor insulation damage.	Replace the servo motor
			Servo driver damage	Replace the servo driver.
13	Over load	Appears when switching on the control power	Circuit board failure.	Replace the servo driver.
		Motor appears during operation	Operating in excess of rated torque.	①Check the load ②Reduce start/stop frequency. ③Reduce the torque limit. ④Replace high power servo drivers and motors.
			Keep the brake on	Check the hold brake.。
			Unsteady oscillation of the motor.	①Adjust the gain. ②Increase the acceleration/deceleration time. ③Reduce the load inertia.
			①servo drivers U, V and W have a phase break. ②Encoder wiring error.	Check the wiring。
14	Brake fault	Appears when switching on the control power	Circuit board failure.	Replace the servo driver.
		Motor appears during operation	Brake resistance wire is disconnected.	rewiring。
			①Brake transistor is damaged. ②Internal brake resistance is damaged.	Replace the servo driver.
			Insufficient capacity of brake circuit.	①Reduce start and stop frequency. ②Increase the acceleration/deceleration time constant. ③Reduce the torque limit. ④Reduce the load inertia. ⑤Change to more powerful ac servo drive unit and motor.
			The main circuit supply voltage is too high.	Check the main power supply.

Alarm Code	Alarm name	Running status	Reasons	Handling method
15	Encoder count error		The encoder is damaged.	Replace encoder
			Encoder wiring error	connection test
			imperfect earth	Correct grounding
16	Motor thermal overload	Appears when switching on the control power	Circuit board fault	Replace the servo driver.
			Parameter setting error.	Set the parameters correctly
		Motor appears during operation	Long run over rated torque。	①Check the load。 ②Reduce start and stop frequency. ④Small torque limits. ⑤Replace high power ac servo drive unit and motor
			Poor mechanical transmission.	Inspection of machinery
19	Thermal reduction		Input control power is unstable.	Check the control power.
			be disturbed	①Add line filters. ②Stay away from distractions
20	EEPROM error		Damage to chip or circuit board	①Replace the servo driver.。 ②After the fix, the servo driver model code (parameter P00.01) must be reset and the default parameters restored。
23	A/D chip error		①Damage to chip or circuit board ②current sensor is damaged.	Replace the servo driver.
30	encoder Z pulse is lost		①Z pulse not present, encoder damaged。 ②Cable is bad。 ③Poor cable shielding。 ④The shielded ground wire is not properly connected。 ⑤Encoder interface circuit failure。	①Replace encoder ②Check the encoder interface circuit.
31	Encoder UVW signal error		①encoder UVW signal is damaged. ②encoder Z signal is damaged. ③Bad cable. ④Poor cable shielding. ⑤shielded ground wire is not properly connected. ⑥Encoder interface circuit failure.	①Replace encoder ②Check the encoder interface circuit.
32	Encoder UVW illegal coding of signal		① encoder UVW signal is damaged ②Bad cable. ③Poor cable shielding. ④shielded ground wire is not properly connected. ⑤Encoder interface circuit failure。	①Replace encoder ②Check the encoder interface circuit

Appendix: servo motor/servo drive selection table

Motor driver	Servo motor	Voltage	Power	Rated current	Rated torque	Rated speed	Rotor inertia 10^{-3}kg.m^2
KA03	40SF-M00130	220 V	50 W	0.4	0.16	3000	0.0025
KA03	40SF-M00330	220 V	100 W	0.6	0.32	3000	0.0051
KA03	60SFM-E00630	220 V	200 W	1.3	0.64	3000	0.0264
KA03	60SFM-E01330	220 V	400 W	2.6	1.27	3000	0.0407
KA03	60SFM-E01930	220 V	600 W	3.1	1.91	3000	0.0526
KA03	80SFM-E01330	220 V	400 W	2.0	1.27	3000	0.105
KA05	80SFM-E02430	220 V	750 W	3.0	2.39	3000	0.182
KA05	80SFM-E03520	220 V	730 W	3.0	3.5	2000	0.263
KA05	80SFM-E03530	220 V	1.1 kW	4.5	3.5	3000	0.263
KA05	80SFM-E04025	220 V	1.0 kW	4.4	4.0	2500	0.297
KA10	80SFM-E04030	220 V	1.2 kW	4.5	4.0	3000	0.297
KA05	90SFM-E02430	220 V	750 W	3.0	2.4	3000	0.245
KA05	90SFM-E03520	220 V	730 W	3.0	3.5	2000	0.34
KA05	90SFM-E04025	220 V	1.0 kW	4.0	4.0	2500	0.37
KA03	110SFM-E02030	220 V	600 W	2.5	2.0	3000	0.31
KA05	110SFM-E04020	220 V	800 W	3.5	4.0	2000	0.54
KA10	110SFM-E04030	220 V	1.2 kW	5.0	4.0	3000	0.54
KA10	110SFM-E05030	220 V	1.5 kW	6.0	5.0	3000	0.63
KA10	110SFM-E06020	220 V	1.2 kW	4.5	6.0	2000	0.76
KA10	110SFM-E06030	220 V	1.8 kW	6.0	6.0	3000	0.76
KA05	130SFM-E05025	220 V	1.0 kW	4.0	4.0	2500	0.85
KA10	130SFM-E05025	220 V	1.3 kW	5.0	5.0	2500	1.06
KA10	130SFM-E06025	220 V	1.5 kW	6.0	6.0	2500	1.26
KA15	130SFM-E07725	220 V	2.0 kW	7.5	7.7	2500	1.53
KA10	130SFM-E10010	220 V	1.0 kW	4.5	10.0	1000	1.94
KA10	130SFM-E10015	220 V	1.5 kW	6.0	10.0	1500	1.94
KA15	130SFM-E10025	220 V	2.6 kW	10.0	10.0	2500	1.94
KA15	130SFM-E15015	220 V	2.3 kW	9.5	15.0	1500	2.77
KA20	130SFM-E15025	220 V	3.8 kW	13.5	15.0	2500	2.77
KA15	180SFM-E17015	220 V	2.5 kW	10.0	17.0	1500	3.40
KA15	180SFM-E19015	220 V	3.0 kW	12.0	19.0	1500	3.80
KA25	180SFM-E21520	220 V	4.5 kW	14.0	21.5	2000	4.70
KA25	180SFM-E27015	220 V	4.3 kW	16.0	27.0	1500	6.10
KA20	180SFM-E35010	220 V	3.7 kW	16.0	35.0	1000	8.60
KA30	180SFM-E35015	220 V	5.5 kW	24.0	35.0	1500	8.60
KA40	180SFM-E48015	220 V	7.5 kW	32.0	48.0	1500	9.50