

# VEICHI



# Manual

## SD600A-SMM Series AC Servo System

## VEICHI

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# Chapter 1 Overview

## 1.1 Product Confirmation

### 1.1.1 Product Confirmation Items

On receiving the product, please confirm the following items.

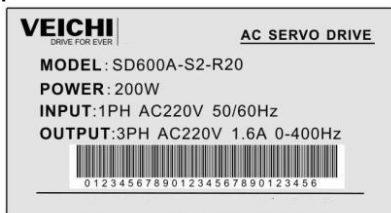
Confirmation items	Note
If the product is the one you ordered	Please confirm according to the 'model' on the servo motor template.
If servo motor rotation axis is running smoothly	Rotate gently means normal; rotate stuck means abnormal
Is there any broken	Check the appearance, check if there's damage caused by transport

 <b>NOTE</b>	<p><b>Any problem found during product confirmation, please do not do the trial run, please contact the local support vendor or the company's technology department.</b></p>
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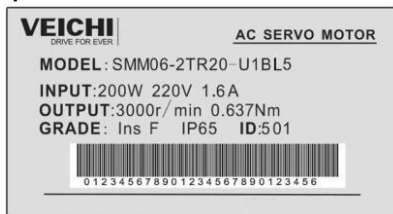
Other than servo drives and servo motors, operable servo components also include:

	Name	Qty	Function	Note
Standard components	5PIN spring wiring terminal	1	Connecting power input L1C,L2C,L1,L2,L3	For drives not more than 1.5KW
	3PIN spring wiring terminal a	1	Connecting U,V,W	
	3PIN spring wiring terminal b	1	Connecting P,D,C (braking resistance selection terminal) 6000. 50000 (attached with 2 spring handle, 1 jumper)	
	User manual	1	Servo user manual	For all series
	6Pin serial port plug	1	Connecting CN3 communication signal terminal	
	44Pin serial port plug	1	Connecting CN1 communication signal terminal	
	Metal jumper	1	Using internal braking resistance jumper (connecting PD)	
Optional components	Plug suite	1	Motor encoder and power wire adaptable plug (1 set including 2 plugs)	Users buy wire by themselves
	Motor power wire	1	One end is connected to the motor terminals; the other end connecting by three servo drive phase sequence U,V, W; the yellow-green ground wire connected to the servo drive	Buy standard cable from our company, please refer to this manual when you buy:
	Encoder wire	1	One end is connected to the encoder phase, the other end connecting to the drive CN2.	Chapter 2.4 Cable Selection - Page 6

## 1.1.2 servo drive nameplate

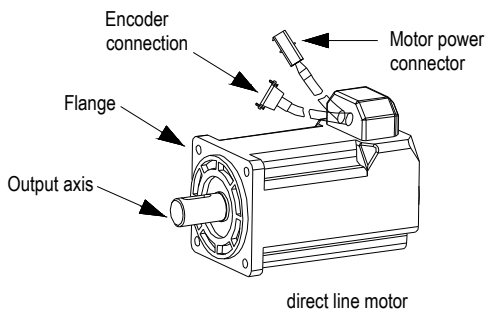


## 1.1.3 servo motor nameplate

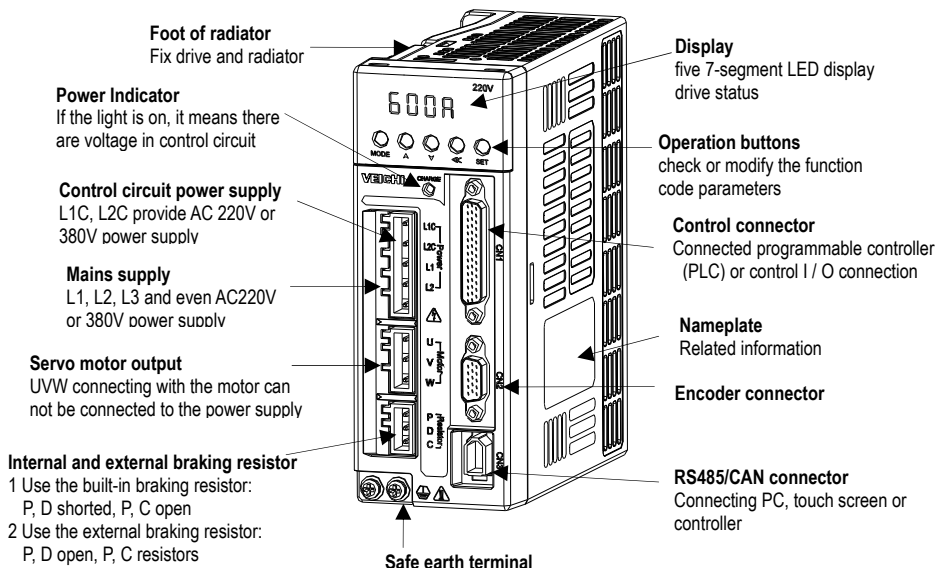


## 1.2 Product name

### 1.2.1 Servo motor names



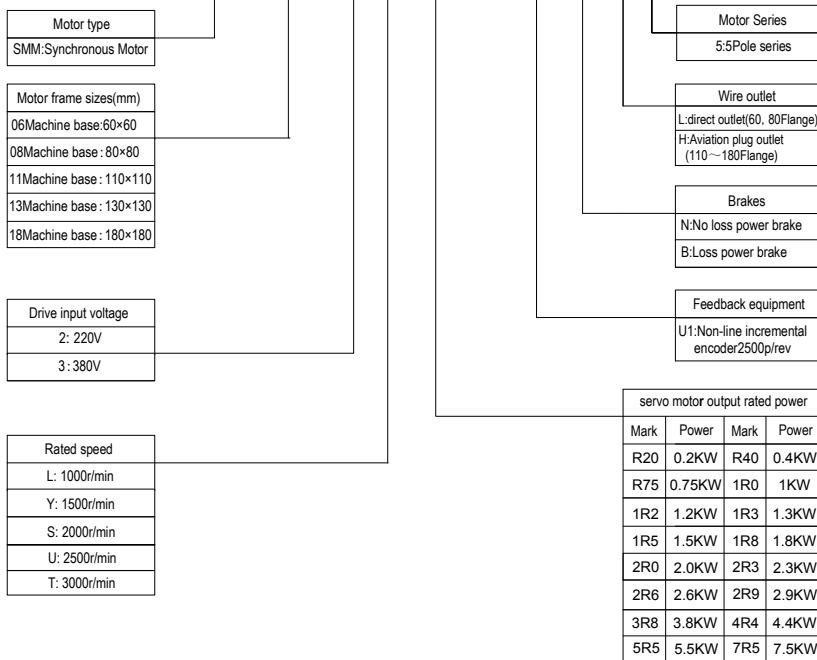
## 1.2.2 Servo drive names



## Chapter 2 Model Selection

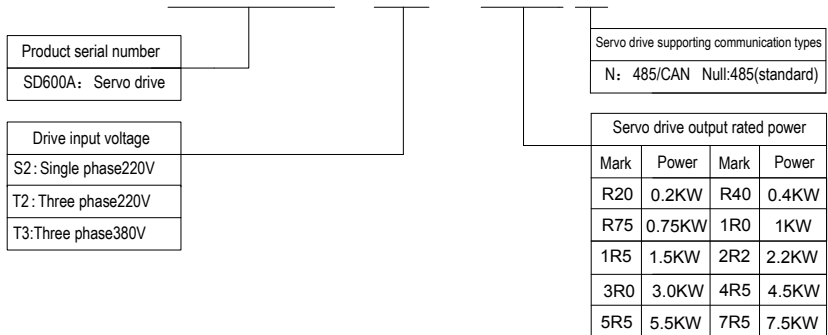
### 2.1 servo motor model specification

#### SMM 06 - 2 T R20 - U1 N L 5



### 2.2 Servo drive model specification

#### SD600A - S2 - R20 N



## 2.3 Servo system config specs list

AC220V voltage level

Rated speed (rpm)	Servo motor			Servo drive
	Power(KW)	Model:SMM□-□□□-***		AC220V
3000	0.1	60 flange	SMM06-2TR10-U1NL5	SD600A-S2-R20
	0.2		SMM06-2TR20-U1NL5	SD600A-S2-R20
	0.4		SMM06-2TR40-U1NL5	SD600A-S2-R40
	0.6		SMM06-2TR60-U1NL5	SD600A-T2-R75
	0.75	80 flange	SMM08-2TR75-U1NL5	SD600A-S2-R75
			SMM08-2TR75-U1NL5	SD600A-T2-R75
	1		SMM08-2T1R0-U1NL5	SD600A-T2-1R0
	1.2	110 flange	SMM11-2T1R2-U1NH	SD600A-T2-1R0
	1.5		SMM11-2T1R5-U1NH	SD600A-T2-1R5
	1.8		SMM11-2T1R8-U1NH	SD600A-T2-1R5
2500	1	130 flange	SMM13-2U1R0-U1NH5	SD600A-T2-1R0
	1.3		SMM13-2U1R3-U1NH5	SD600A-T2-1R0
	1.5		SMM13-2U1R5-U1NH5	SD600A-T2-1R5
	2		SMM13-2U2R0-U1NH5	SD600A-T2-1R5
	2.6		SMM13-2U2R6-U1NH5	SD600A-T2-2R2
	3.8		SMM13-2U3R8-U1NH5	SD600A-T2-3R0
2000	1.2	110 flange	SMM11-2S1R2-U1NH	SD600A-T2-1R0
1500	1.5	130 flange	SMM13-2Y1R5-U1NH5	SD600A-T2-1R5
	2.3		SMM13-2Y2R3-U1NH5	SD600A-T2-2R2
1000	1	130 flange	SMM13-2L1R0-U1NH5	SD600A-T2-1R0

AC380V voltage level

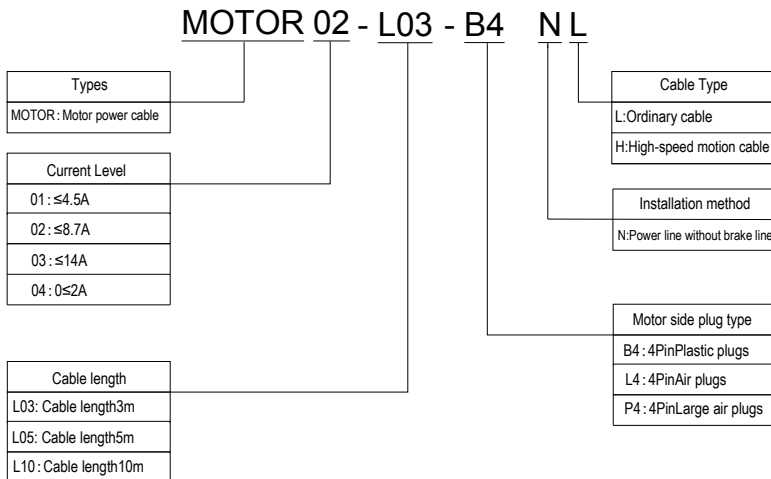
Rated speed (rpm)	Servo motor			Servo drive
	Power(KW)	Model:SMM□-□□□-***		AC380V
1500	2.9	180 flange	SMM18-3Y2R9-U1NH5	SD600A-T3-3R0
	4.4		SMM18-3Y4R4-U1NH5	SD600A-T3-4R5
	5.5		SMM18-3Y5R5-U1NH5	SD600A-T3-5R5
	7.5		SMM18-3Y7R5-U1NH5	SD600A-T3-7R5



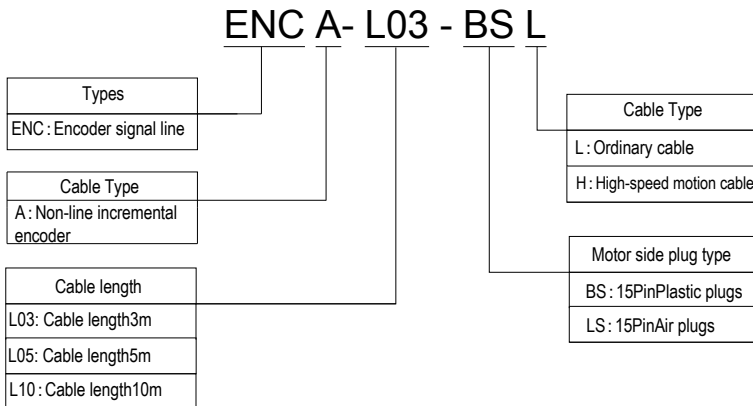
## 2.4 Cable model selection

The Company provides the corresponding cables for the user to select. Please select according to the servo motor and servo drives specific model (Note: please select high-speed motion cable when the cable is mounted on towline and other sports occasions).

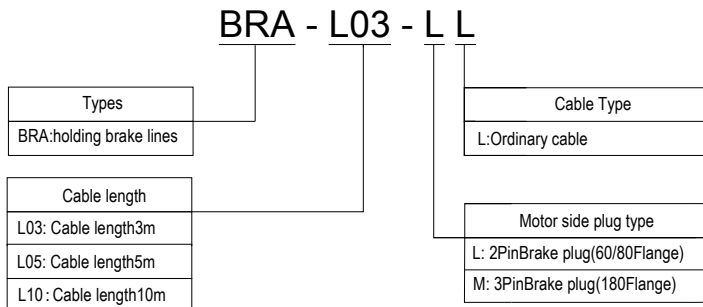
### (1) Motor power cable model specification



### (2) Encoder signal cable model specification

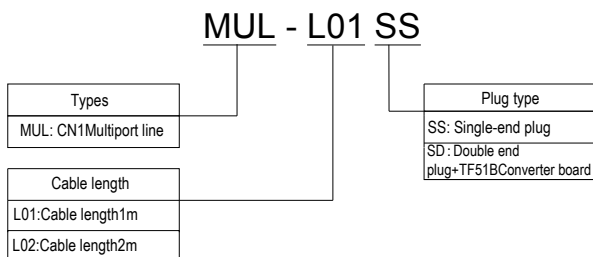


## (3) Brake line model specification



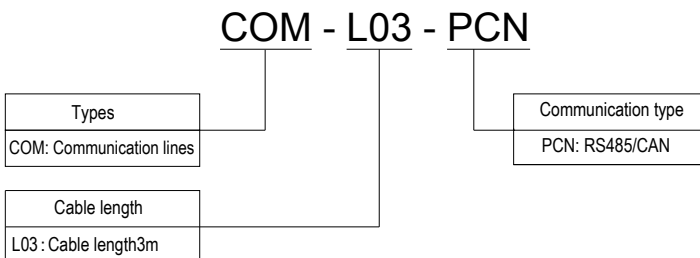
**Note: only motor with holding brake need to choose this cable. Optional 130 flange motor holding brake lines please refer to the servo system selection table.**

## (4) CN1 terminal line model specification



**NOTE: MUL- □ -SD type CN1 port line is adaptable with the company's TF51B type adapter board, and please select the model together with the adapter plate.**

## (5) Communication cable model specification



## (6) Servo system configuration and cable configuration list (see in next page)

## Servo system(220V)

Servo drive		Servo motor					Supporting cable			
Model	Rated current (A)	Power (W)	Motor model	Torque (N·m)	Rated current(A)	Rated speed	Motor power cable	Motor encoder cable	Motor brake cable	
SD600A-S2-R20	1.6	100	SMM06-2TR10-U1NL5	0.318	1	3000	MOTOR01-①-B4N②	ENCA-①-BS②	BRA-①-LL	
		200	SMM06-2TR20-U1NL5	0.637	1.6	3000	MOTOR01-①-B4N②	ENCA-①-BS②	BRA-①-LL	
SD600A-S2-R40	3.1	400	SMM06-2TR40-U1NL5	1.27	2.8	3000	MOTOR01-①-B4N②	ENCA-①-BS②	BRA-①-LL	
SD600A-S2-R75	3.5	750	SMM08-2TR75-U1NL5	2.38	3	3000	MOTOR01-①-B4N②	ENCA-①-BS②	BRA-①-LL	
SD600A-T2-R75	3.9	600	SMM06-2TR60-U1NL5	1.91	3.5	3000	MOTOR01-①-B4N②	ENCA-①-BS②	BRA-①-LL	
		750	SMM08-2TR75-U1NL5	2.38	3	3000	MOTOR01-①-B4N②	ENCA-①-BS②	BRA-①-LL	
SD600A-T2-1R0	6.3	1000	SMM08-2T1R0-U1NL5	3.2	6.3	3000	MOTOR01-①-B4N②	ENCA-①-BS②	BRA-①-LL	
			SMM13-2U1R0-U1NH5	4	4	2500	MOTOR02-①-L4N②	ENCA-①-LS②	MOTOR02-①-L 4B② (including power line)	
			SMM13-2L1R0-U1NH5	10	5	1000	MOTOR02-①-L4N②	ENCA-①-LS②		
		1300	SMM13-2U1R3-U1NH5	5	5	2500	MOTOR02-①-L4N②	ENCA-①-LS②		BRA-①-ML
			1200	SMM11-2S1R2-U1NH	6	4.5	2000	MOTOR02-①-L4N②	ENCA-①-LS②	
				SMM11-2T1R2-U1NH	4	5	3000	MOTOR02-①-L4N②	ENCA-①-LS②	
SD600A-T2-1R5	8.7	1800	SMM11-2T1R8-U1NH	6	6	3000	MOTOR02-①-L4N②	ENCA-①-LS②	MOTOR02-①-L 4B② (including power line)	
			1500	SMM11-2T1R5-U1NH	5	6	3000	MOTOR02-①-L4N②		
		SMM13-2U1R5-U1NH5		6	6.3	2500	MOTOR02-①-L4N②	ENCA-①-LS②		
		SMM13-2Y1R5-U1NH5		10	7	1500	MOTOR02-①-L4N②	ENCA-①-LS②		
		2000	SMM13-2U2R0-U1NH5	7.7	7.5	2500	MOTOR02-①-L4N②	ENCA-①-LS②		

SD600A-T2-2R2	12.2	2300	SMM13-2Y2R3-U1NH5	15	11	1500	MOTOR03-①-L4N②	ENCA-①-LS②	MOTOR03-①-L4B② (including power line)
		2600	SMM13-2U2R6-U1NH5	10	11	2500	MOTOR03-①-L4N②	ENCA-①-LS②	
SD600A-T2-3R0	14	3800	SMM13-2U3R8-U1NH5	15	14	2500	MOTOR03-①-L4N②	ENCA-①-LS②	

**Servo system (380V)**

Servo drive		Servo motor					Supporting cable		
Model	Rated current (A)	Power (W)	Motor model	Torque (N·m)	Rated current(A)	Rated speed	Motor power cable	Motor encoder cable	Motor brake cable
SD600A-T3-3R0	8.5	2900	SMM18-3Y2R9-U1NH5	18.5	8.5	1500	MOTOR03-①-P4N②	ENCA-①-LS②	BRA-①-ML
SD600A-T3-4R5	10.8	4400	SMM18-3Y4R4-U1NH5	28	10.8	1500	MOTOR03-①-P4N②		
SD600A-T3-5R5	12	5500	SMM18-3Y5R5-U1NH5	35	12	1500	MOTOR03-①-P4N②		
SD600A-T3-7R5	20	7500	SMM18-3Y7R5-U1NH5	47.7	20	1500	MOTOR04-①-P4N②		

**Note:**

- Users need to select the right supporting cable models based on the selected moter type for servo motor power line and servo motor encoder cable.
- There're ordinary line and high-speed motion line for the motor power line and encoder signal lines, please use the high-speed motion cable for conditions when motor follows the load, such as screw, etc.
- the above type are non-energized motor brakes, brake required or may otherwise indicated in the above-mentioned motor type SMM □ - □□□ - □□ N □ of N is changed to B.
- 130 flange brake motors namely: SMM13- □□□ -U1BH5, the series motor adapts to brake cable MOTOR □ -①-L4B② (included power lines), do not need to purchase power cables.
- "①" indicates the cable length in the table, namely L03 (3m), L05 (5m), L10 (10 meters) of cable length the special requirements can be customized according to requirements.

"②" indicates the cable types in the table, namely L (general cable), H (high-speed motion cable).

## 2.5 Peripherals

### 2.5.1 Braking resistance

Servo drive model		Built-in renewable resistance specification		Minimum resistance allowed ( $\Omega$ )
		Resistance ( $\Omega$ )	Capacity(W)	
Single phase 220V	SD600A-S2-R20	40	60	40
	SD600A-S2-R40	40	60	40
	SD600A-S2-R75	40	60	40
Single phase/three phase 220V	SD600A-T2-R75	40	60	40
	SD600A- T2-1R0	40	60	40
	SD600A- T2-1R5	40	60	40
	SD600A- T2-2R2	20	100	20
	SD600A- T2-3R0	20	100	20
Three phase 380V	SD600A- T3-3R0	20	100	20
	SD600A- T3-4R5			
	SD600A- T3-5R5			
	SD600A- T3-7R5	20	100	20

## Chapter 3 Servo Motor Specification and Dimension

### 3.1 Servo motor standard specification(SMM series)

**Rated time:** Continuous

**Insulation class:** F

**Cooling method:** totally enclosed, self-cooling

**Protection class:** IP65, IP54 shaft

**Excitation method:** permanent magnet

**Installation:** Flange

**Connection:** Direct connection

**Using environment:** Keep away from corrosive, flammable gas, oil droplets, dust.

**Applicable environmental characteristics:** 5 ~ 40 °C in altitude does not exceed 1000m, under normal atmospheric conditions meet the rated output of the motor.

**Temperature characteristics:** less than RH95%, no condensation

**Power consumption:** at 40 °C ~ 50 °C conditions, altitude of over 1000m, each additional 100m, a power reduction of 1.5%

**Loss power brakes (optional):** when there's no excitation or there's a sudden power off, the loss power brakes start to work and the motor shaft does not rotate, avoiding equipment damage or personal injury. When the motor works properly, the loss power brakes remain free state.

**Bearing Features:** All servo motors are imported, single-sided dust ball, ball bearings, high temperature grease, of which the life term under normal load conditions is not less than 20,000 hours.

#### Small inertia (voltage 220V, rated speed 3000rpm)

Servo motor model SMM□-2□□-U1N1.5		06-2T R10	06-2T R20	06-2T R40	06-2T R60	08-2T R75	08-2T 1R0
Rated output	KW	0.1	0.2	0.4	0.6	0.75	1.0
Rated voltage	V	220	220	220	220	220	220
Rated torque	N·m	0.318	0.637	1.27	1.91	2.38	3.2
Instant maximum torque	N·m	0.955	1.91	3.82	5.73	7.2	9.6
Rated current	Arms	1	1.6	2.8	3.5	3	6.3
Instant maximum current	Arms	3	4.8	8.5	11	9	18.9
Rated speed	Rpm	3000	3000	3000	3000	3000	3000
Instant maximum speed	Rpm	5000	5000	5000	5000	3800	5000
Back EMF constant	mV/rpm	21.93	23.7	29.4	34.9	48.9	34.5
Torque constant	N·m/Arms	0.362	0.392	0.486	0.577	0.808	0.57
Electrical time constant	ms	1.56	1.79	2.15	2.24	4.10	4.28
Mechanical time constant	ms	1.58	1.07	0.78	0.70	0.80	0.75
Rotor rotating inertia	×10 <sup>-4</sup> kg·m <sup>2</sup>	0.135	0.232	0.426	0.56	1.4	1.73

**Medium inertia (voltage 220V, rated speed 3000/2000rpm)**

Servo motor model SMM11-2□□-U1NH		11-2S 1R2	11-2T 1R2	11-2T 1R5	11-2T 1R8
Rated output	KW	1.2	1.2	1.5	1.8
Rated voltage	V	220	220	220	220
Rated torque	N·m	6	4	5	6
Instant maximum torque	N·m	12	12	15	18
Rated current	Arms	4.5	5	6	6
Instant maximum current	Arms	13.5	15	18	18
Rated speed	Rpm	2000	3000	3000	3000
Instant maximum speed	Rpm	3200	4400	3500	4000
Back EMF constant	mV/rpm	83	54	62	60
Torque constant	N·m/Arms	1.3	0.8	0.83	1
Electrical time constant	ms	3.2	3	3.33	3.2
Mechanical time constant	ms	1.07	1.427	1.32	1.07
Rotor rotating inertia	$\times 10^{-4}$ kg·m <sup>2</sup>	7.6	5.4	6.3	7.6

**Medium inertia (voltage 220V, rated speed 2500rpm)**

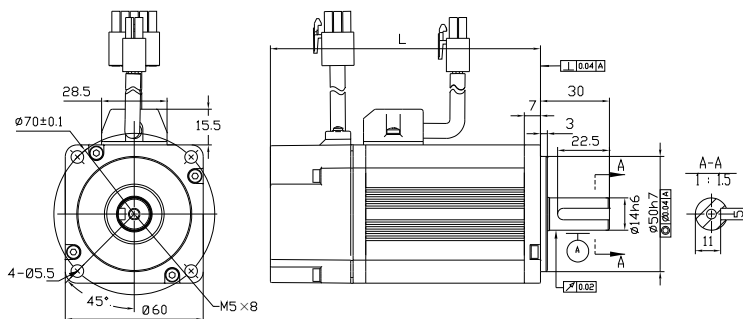
Servo motor model SMM13-2□□-U1NH5		13-2U 1R0	13-2U 1R3	13-2U 1R5	13-2U 2R0	13-2U 2R6	13-2U 3R8
Rated output	KW	1	1.3	1.5	2.0	2.6	3.8
Rated voltage	V	220	220	220	220	220	220
Rated torque	N·m	4	5	6	7.7	10	15
Instant maximum torque	N·m	12	15	18	23	30	45
Rated current	Arms	4	5	6.3	7.5	11	14
Instant maximum current	Arms	12	15	18.9	22.5	33	42
Rated speed	Rpm	2500	2500	2500	2500	2500	2500
Instant maximum speed	Rpm	2700	2800	2800	2800	3000	2800
Back EMF constant	mV/rpm	68.4	66.1	59.9	68.4	61.7	72.1
Torque constant	N·m/Arms	1.13	1.09	0.99	1.13	1.02	1.04
Electrical time constant	ms	7.19	7.40	7.47	8.33	9.00	10.40
Mechanical time constant	ms	2.36	2.20	4.69	1.82	1.37	1.30
Rotor rotating inertia	$\times 10^{-4}$ kg·m <sup>2</sup>	8.7	10.88	13.53	16.76	21.57	40.8

## Large inertia (voltage 220V/380V, rated speed 1500/1000rpm)

Servo motor model SMM□-□□□-U1NH5		13-2L	13-2Y	13-2Y	18-3Y	18-3Y	18-3Y	18-3Y
		1R0	1R5	2R3	2R9	4R4	5R5	7R5
Rated output	KW	1	1.5	2.3	2.9	4.4	5.5	7.5
Rated voltage	V	220	220	220	380	380	380	380
Rated torque	N·m	10	10	15	18.5	28	35	47.7
Instant maximum torque	N·m	30	30	45	46.2	70	87.5	119
Rated current	Arms	5	7	11	8.5	10.8	12	20
Instant maximum current	Arms	15	21	33	22	27	30	50
Rated speed	Rpm	1000	1500	1500	1500	1500	1500	1500
Instant maximum speed	Rpm	1500	2000	2000	2000	2000	2000	2000
Back EMF constant	mV/rpm	126	90.8	91.3	157	163.8	181	158.2
Torque constant	N·m/Arms	2.08	1.5	1.5	2.59	2.71	2.99	2.61
Electrical time constant	ms	8.72	8.47	9.80	17.30	22.00	21	21.48
Mechanical time constant	ms	1.60	1.55	1.20	1.08	1.12	0.81	0.80
Rotor rotating inertia	$\times 10^{-4} \text{g} \cdot \text{m}^2$	21.57	21.57	32.83	39.4	66	87.75	122.8

## 3.2 Servo motor dimension checklist

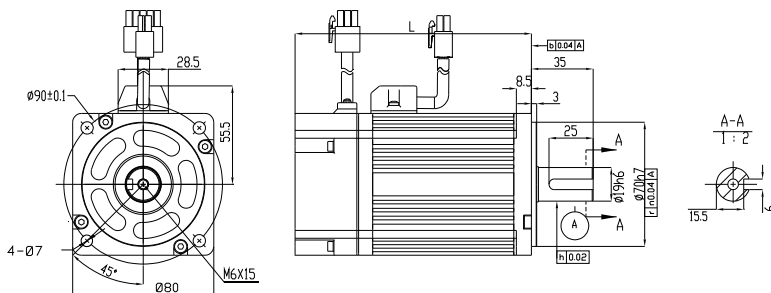
## 3.2.1 SMM06-□□□-U1NL5 installation dimension



Servo motor power	Motor model	Length L (no brakes)	L (with brakes)
100W	SMM06-2TR10-U1NL5	81.5	112
200W	SMM06-2TR20-U1NL5	93.5	124.5
400W	SMM06-2TR40-U1NL5	117.5	148.5
600W	SMM06-2TR60-U1NL5	134.5	165.5

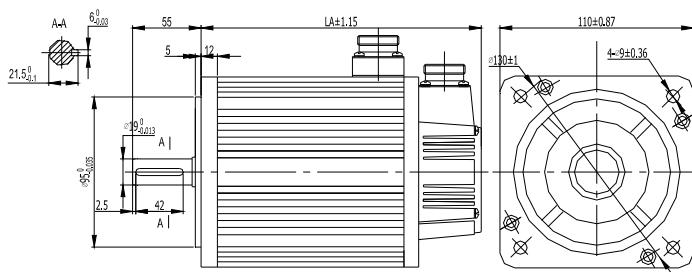


### 3.2.2 SMM08-□□□-U1NL5 installation dimension



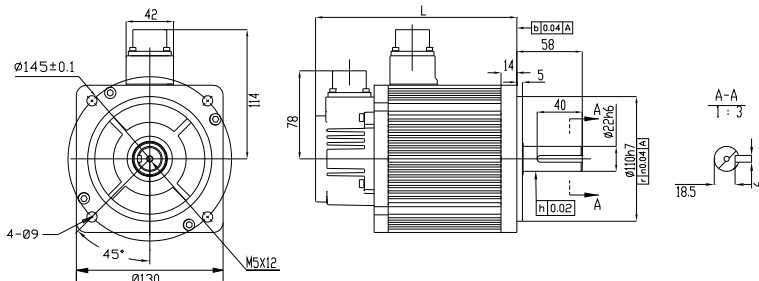
Servo motor	Motor model	Length L (no brakes)	L (with brakes)
750W	SMM08-2TR75-U1NL5	136	167.5
1000W	SMM08-2T1R0-U1NL5	151	182.5

### 3.2.3 SMM11-□□□-U1NH installation dimension



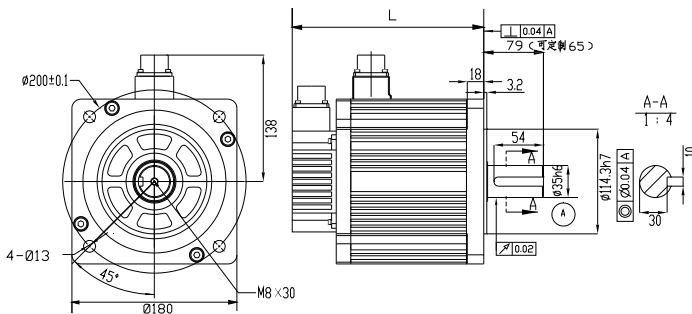
Servo motor	Motor model	Length L (no brakes)	L (with brakes)
1200W	SMM11-2T1R2-U1NH	189	263
1200W	SMM11-2S1R2-U1NH	219	293
1500W	SMM11-2T1R5-U1NH	204	278
1800W	SMM11-2T1R8-U1NH	219	293

### 3.2.4 SMM13-□□□-U1NH5 installation dimension



Servo motor	Motor model	Length L (no brakes)	L (with brakes)
1000W	SMM13-2U1R0-U1NH5	153	168
1000W	SMM13-2L1R0-U1NH5	193	215
1300W	SMM13-2U1R3-U1NH5	158	178
1500W	SMM13-2U1R5-U1NH5	168	193
1500W	SMM13-2Y1R5-U1NH5	193	215
2000W	SMM13-2U2R0-U1NH5	178	193
2300W	SMM13-2Y2R3-U1NH5	228	250
2600W	SMM13-2U2R6-U1NH5	193	215
3800W	SMM13-2U3R8-U1NH5	250	265


### 3.2.5 SMM18-3□□-U1NH5 installation dimension



Servo motor	Motor model	Length L (no brakes)	L (with brakes)
2900W	SMM18-3Y2R9-U1NH5	185	246
4400W	SMM18-3Y4R4-U1NH5	209	246
5500W	SMM18-3Y5R5-U1NH5	246	292
7500W	SMM18-3Y7R5-U1NH5	292	

## Chapter 4 Servo Drive Specification and Dimension

### 4.1 Servo drive standard specification

 Caution
If using servo drive when input power exceeds the norm, it may lead to alarm. When the power supply voltage does not meet the following values, be sure to use step-down transformer to control the power supply voltage within specified range.

#### 4.1.1 Single/three phase 220V level servo drive

Structure size	SIZE-A			SIZE-B			SIZE-C	
Drive model	SD600A-S2-□			SD600A-T2-□			SD600A-T2-□	
	R20	R40	R75	R75	1R0	1R5	2R2	3R0
Continuous output current (Arms)	1.6	3.1	3.5	3.9	6.3	8.7	12.2	14
Maximum output current (Arms)	4.8	9.3	10.5	11.7	18.9	26.1	36.6	42
Main circuit power supply	Single phase 220VAC±15%			Single/three phase 220VAC±15%			Three phase 220VAC±15%	
Control circuit power supply	50/60Hz±5%			50/60Hz±5%			50/60Hz±5%	
Brake hanging function	Built-in resistance, external resistance can be used when the braking capacity is not enough							

#### 4.1.2 Three phase 380V level servo drive

Structure size	SIZE-C			
Drive model	SD600A-T3-□			
	3R0	4R5	5R5	7R5
Continuous output current (Arms)	8.5	10.8	12	20
Maximum output current (Arms)	25.5	32.4	36	60
Main circuit power supply	Three phase 380VAC±15%, 50/60Hz±5%			
Control circuit power supply				
Brake hanging function	Built-in resistance, external resistance can be used when the braking capacity is not enough			

#### 4.1.3 Servo drive general rated value and specification

Power range(KW)		0.2	0.4	0.75	0.75	1.0	1.5	2.2	3.0	3.0	4.5	5.5	7.5
Power	Phase/voltage	Single phase 220VAC			Single/three phase 220VAC			Three phase 220VAC		Three phase 380VAC			
	Allowed voltage variation range	220VAC±15%			220VAC±15%					380VAC±15%			
	Allowed frequency variation range	50/60Hz±5%											
Cooling methods		Natural cooling			Fan cooling								
Encoder lines		2500p/r(incremental wireless/no wireless)											
Control mode		Speed control, position control, torque control, speed / position control, torque / speed control, position / torque control, jog control											

Operation panel		5 press button, LED 5 bits
Renewable braking resistance		Built-in resistance, external resistance can be used when the braking capacity is not enough
Position control mode	Maximum input pulse frequency	Differential input mode: 500KHZ Collector input mode: maximum 200KHZ
	Pulse command mode	Pulse+symbol, A, B phase quadrature pulse, CW+CCW pulse
	Command control mode	External pulse instruction/internal register instruction
	Command smooth mode	First-order low-pass filter, S type curve smoothing filter
	Electronic gear ratio	Electronic gear ratio: A/B ( $1/50 < A/B < 200$ ) 【A: 1~32767, B: 1~32767】
	Torque limit	External analog or internal register
	Feedforward compensation	Parameter setting
Speed control mode	Analog speed command input	Voltage range: $0 \sim \pm 10V$ , input impedance: $10K\Omega$ ; time parameter: $2.2\mu s$
	Speed control range	1:5000
	Command control mode	External analog/internal register
	Command smooth mode	First-order low-pass filter, S type curve smoothing filter
	Torque limit	External analog or internal register
	Frequency width	Maximum 400Hz
	Speed variation rate 【note 1】	Instantaneous load percentage change (0 to 100%), speed variation rate $\pm 0.01\%$ ; input voltage fluctuation $\pm 10\%$ , speed variation rate $\pm 0.01\%$ ; external ambient temperature variation ( $0 \sim 50\text{ }^{\circ}C$ ), speed variation rate $\pm 0.01\%$
Torque control	Analog command input	Voltage range $0 \sim \pm 10V$ ; input impedance $10K\Omega$ ; time parameter $2.2\mu s$
	Command control mode	External analog/internal register
	Command smooth mode	Low-pass filter
Digital value input/output		It can be arbitrarily assigned via the function parameter into common nine digital inputs, six digital outputs
Protection function		Overvoltage, undervoltage, overcurrent, overheating, over speed, overload, encoder failure, the position error is too large, Eeprom failure
Alarm query		Record fault code, speed, voltage, current, time when alarming
Communication interface		RS485 (standard), CAN (optional)
Environment specification	Installation place	Indoor (avoid direct sunlight), non-corrosive mist (to avoid fumes, flammable gas and dust)
	Elevation	<1000m, (>1000m, please derate when using)

cation	Environment temperature $t_{21}$	0~55℃ (if environment temperature exceeds specification range, please adjust the surrounding air circulation)
	Storage temperature	-20~65℃
	Storage humidity	<0~90%RH (no condensation)

**Note 1: speed variation rate is defined by:**

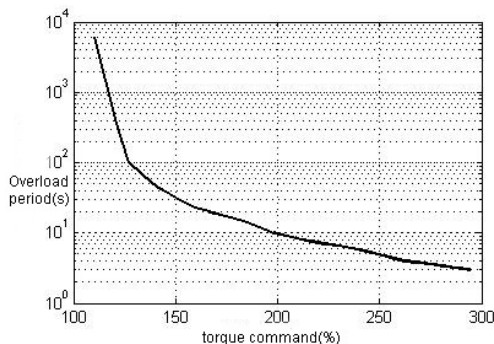
$$\text{speed variation rate} = \frac{\text{no load speed} - 100\% \text{ load speed}}{\text{rated speed}} \times 100\%$$

In fact, the voltage and temperature changes will cause the operation amplifier bias, leading to changes in the resistance value calculation. Thus, the impact will be manifested through the speed; speed change can be represented according to the rated speed ratio.

**Note 2: Please install the servo drive within a certain temperature range. If stored in electric cabinet, the electrical cabinet temperature should not exceed this temperature.**

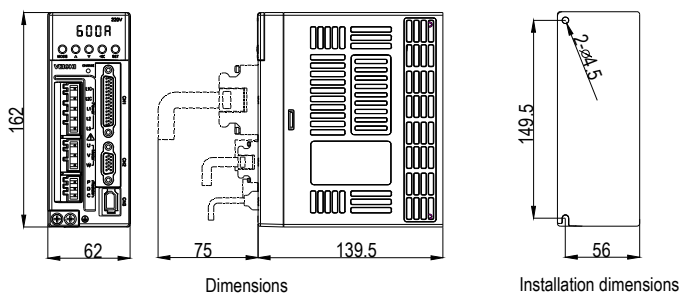
## 4.2 Servo drive overload protection features

There's built-in protection function in servo drive and the drive can be protected when the servo motor and servo drive overload. Therefore, the servo drive allowable power-on time is restricted due to the built-in overload protection function; as shown in the following figure.

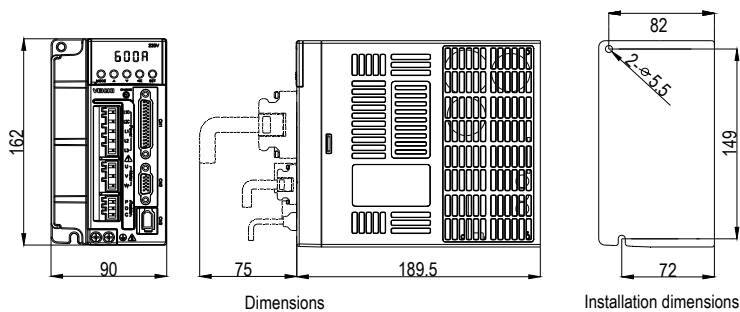


### 4.3 Servo drive dimension size list

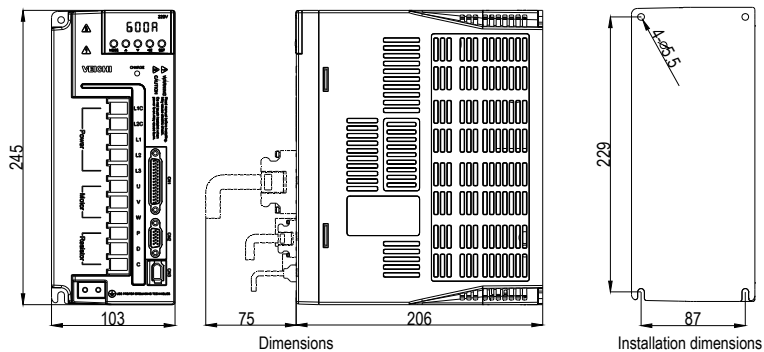
#### (1) Size A



#### (2) Size B



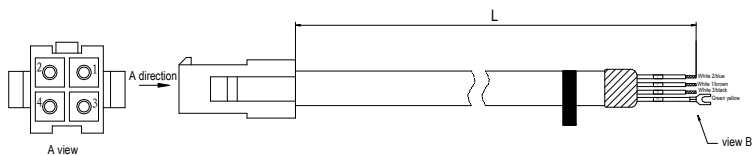
#### (3) Size C



## Chapter 5 Cable Specification and Dimension

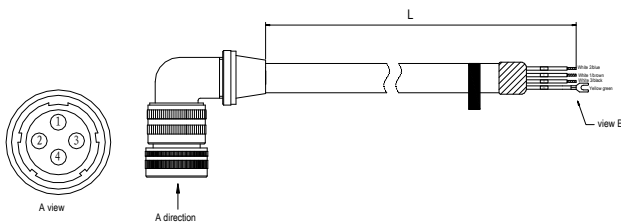
### 5.1 Servo motor power cable

#### (1) MOTOR□-□-B4N□

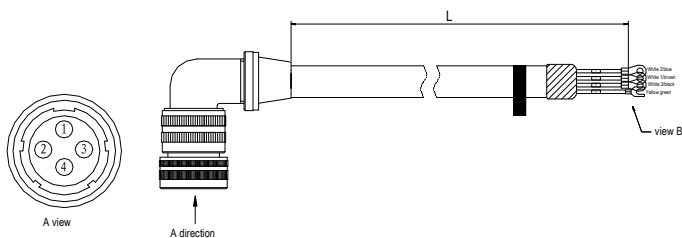


Signal	A Needle foot number	Color
U	2	White 1/brown
V	1	White 2/blue
W	3	White 3/black
PE	4	Green yellow

#### (2) MOTOR□-□-L4N□



#### (3) MOTOR□-□-P4N□

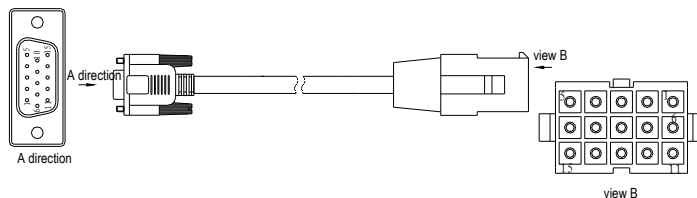


(2) (3) cable wiring are defined as follows:

Signal	A Needle foot number	Color
U	3	White 1/brown
V	2	White 2/blue
W	4	White 3/black
PE	1	Yellow green

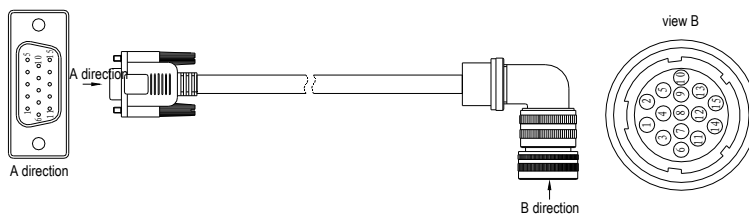
## 5.2 Servo motor encoder cable

### (1) ENCA-□-BS□



Signal	A Needle foot number	B Needle foot number	Signal	A Needle foot number	B Needle foot number
+5V	15	2	U+	9	6
0V	14	3	U-	4	8
A+	6	9	V+	10	10
A-	1	13	V-	5	12
B+	7	4	W+	11	11
B-	2	14	W-	12	15
Z+	8	7	PE	Internal steel cover	1
Z-	3	5			

### (2) ENCA-□-LS□

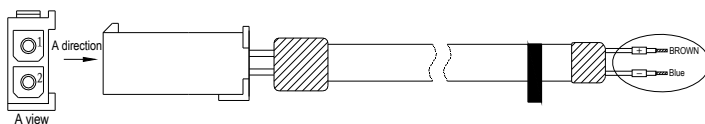


Signal	A Needle foot number	B Needle foot number	Signal	A Needle foot number	B Needle foot number
+5V	15	2	U+	9	10
0V	14	3	U-	4	13
A+	6	4	V+	10	11
A-	1	7	V-	5	14
B+	7	5	W+	11	12
B-	2	8	W-	12	15
Z+	8	6	PE	Internal steel cover	1
Z-	3	9			

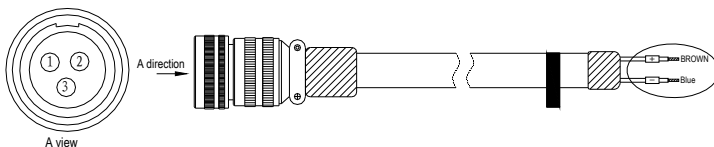


### 5.3 Servo motor brake cable

(1) BRA—□-LL



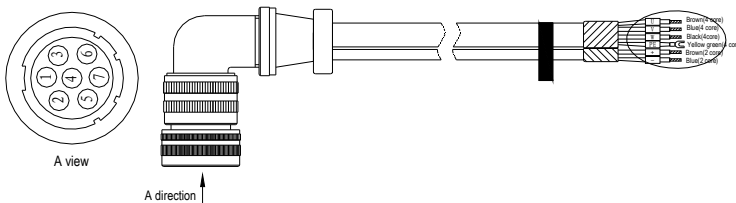
(2) BRA—□-ML



The cables above are defined as follows:

Signal	A Needle foot number	Color
+	1	Brown
-	2	Blue

(3) MOTOR□-□-L4B□

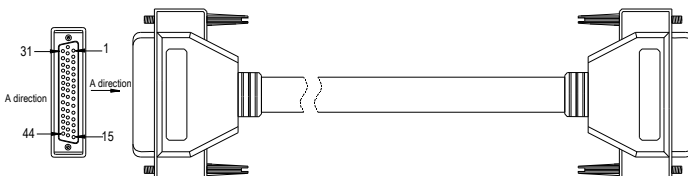


Signal	A Needle foot number	Color	Signal	A Needle foot number	Color
PE	1	Yellow green(4 core)	W	4	Black (4 core)
U	2	Brown(4 core)	+	6	Brown(2 core)
V	3	Blue(4 core)	-	7	Blue(2 core)

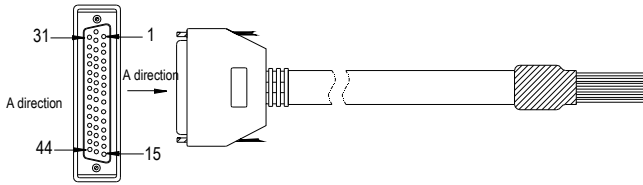
### 5.4 Servo drive input/output cable

#### 5.4.1 Servo drive input/output cable outline drawing

(1) MUL—□-SS

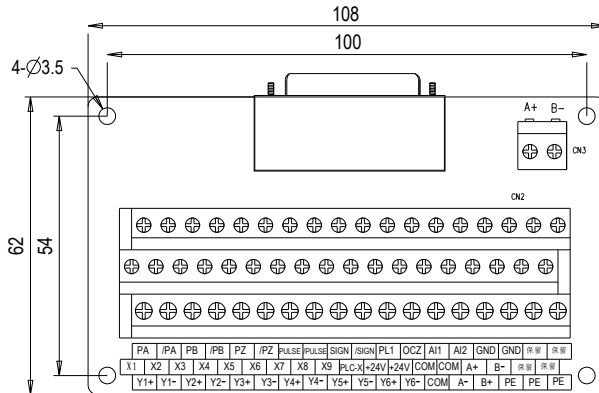


(2) MUL—□-SD



**Note:** MUL—□-SD cable adaptable to the TF51B switch board, please select the model accordingly.

(3) TF51B



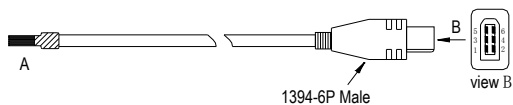
5.4.2 Servo drive input/output cable wiring diagram

Needle	Signal	Stranded wire	N	Signal	Stranded wire specification
1	Y4+	1	41	/PULSE	1
26	Y4-		43	PULSE	
2	Y3-	1	40	Reserved	1
3	Y3+		42	Reserved	
4	Y2-	1	14	COM	1
5	Y2+		17	+24V	
6	Y1-	1	18	AI2	1
7	Y1+		19	GND	
13	PZ	1	8	X4	1
24	/PZ		9	X1	
15	Y6-	1	10	X2	1
16	Y6+		11	PLC-X	
21	PA	1	29	GND	1
22	/PA		20	AI1	
23	/PB	1	12	X9	1
25	PB		30	X8	
27	Y5-	1	31	X7	1
28	Y5+		32	X6	

36	Reserved	1	33	X5	1
38	Reserved		34	X3	
37	/SIGN	1	35	PL1	1
39	SIGN		44	OCZ	

## 5.5 Servo drive communication cable

### 5.5.1 Servo drive communication cable outline drawing



(COM-L03-PCN)

### 5.5.2 Servo drive communication cable wiring diagram

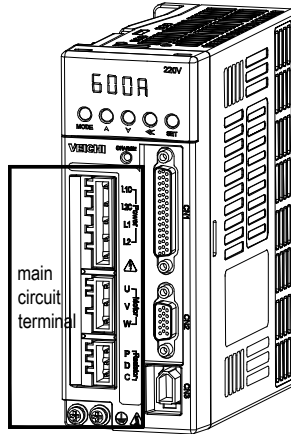
A terminal	B terminal		Color
Signal name	Needle foot number	Signal name	
CANH	1	CANH	Yellow
CANL	2	CANL	White
RS485+	5	A+	Red
RS485-	6	B-	Black

## Chapter 6 Wiring


This chapter explains the significance of the wiring method and the meaning of servo drive signals, and lists standard wiring diagrams of various modes.


### 6.1 Main circuit wire

This section describes the name, specifications, wiring examples and power ON sequence of the main circuit terminals.

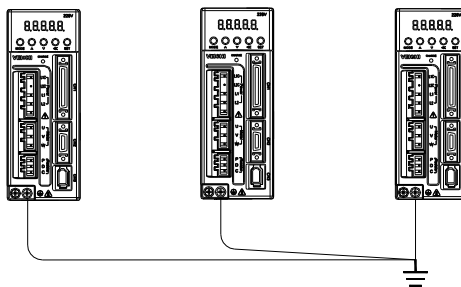
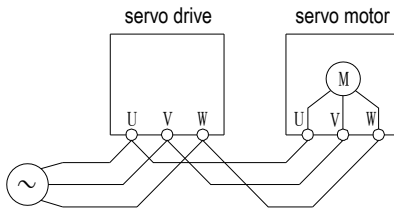
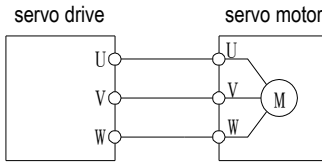


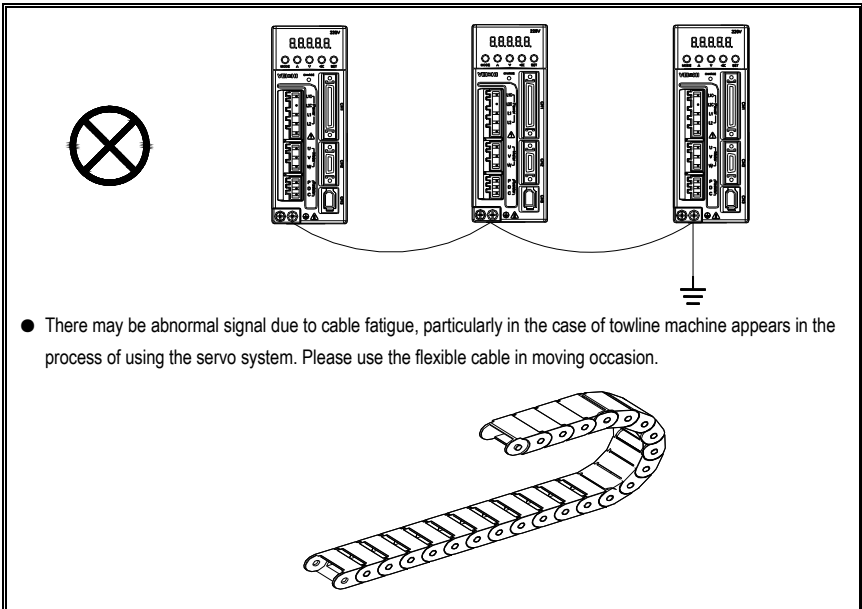
#### 6.1.1 Main circuit terminal name and specification

Mark	Name	Specification
L1, L2, L3	Main circuit power source input terminal	Connecting single-phase / three-phase AC power supply (depending on product model, select the appropriate voltage specifications, single-phase 220V L1 and L2 can be connected only)
L1C, L2C	Control power source input terminal	Connect single phase AC power source( select suitable voltage specification according to product model)
P, D, C	Retrogradation resistance terminal	Use the internal regeneration resistance terminal, short between P / D, but P / C open), when there is insufficient braking capability, open set P / D circuit and connect an external regenerative resistor between P/C. External regenerative resistor must be purchased separately.
U, V, W	Motor connecting wire	Connect to the motor according to the sequence.
	Earth protecting terminal	Connect the power supply ground terminal and the motor ground terminal.

 **Caution**

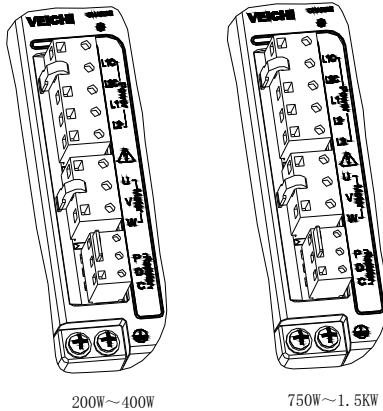
- When there's still high voltage in servo drive after turning off the power, do not touch the power terminals within five minutes, and operation can be carried out after the user confirm the CHARGE lamp, otherwise there is danger of electric shock;
- Prohibit frequent power on/off, and when repeatedly switch voltage is needed, please control in less than 1 time within 1 minute
- Please do not connect the input power cable to the servo drive output terminals UVW, otherwise it will cause damage to the servo drive;
- L1, L2, L3 (L1C, L2C) and U, V, W the six power lines should not be close to other signal lines, spacing more than 30cm (11.8 inches), otherwise it may cause servo system malfunction.
- When using the internal braking resistor, shorting must be connected between P and D terminals, otherwise it may cause a fire; do not connect the wires directly to between P and C;





### 6.1.2 Main circuit power supply connector(Spring-type) wiring method

Spring-type connector terminal is used for 1.5KW and less power servo drives.



The detailed description of the spring-type terminal wiring step

(1)Wire Size

Wire size that can be used as follows:

Single line:φ0.5~φ1.6mm

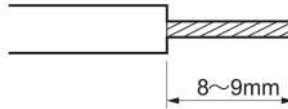
(2)Connection methods

1,Remove terminal platform from the servo drive

Before wiring, remove the wiring terminals from the servo drive. If you do not remove the terminals and wire directly may cause damage to the servo drive.

## 2, Wire stripping

Strip the wire cover 8~9mm.



## 3. Open the wiring insertion slot of the wiring terminal

There are two methods of opening the wire insertion slot, as shown below:

Open the slot by the control lever of the servo drives (see Figure A) below;

insert a screwdriver into an opening port in the terminals (terminal width 3.0 ~ 3.5mm), and then press firmly to open the slot (as shown in Figure B).

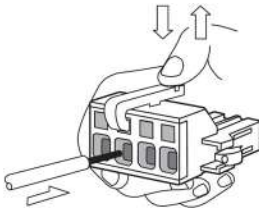


Diagram A

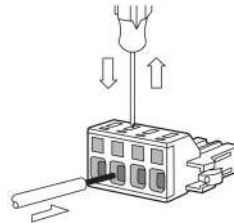


Diagram B

## 4. Insert the wire into the slot

After opening the slot, insert the stripped end of the wire, then release the control lever or screwdriver so that the slot can be closed.

## 5. Reset the wiring terminals onto the servo drive

After connecting all the terminals, put the wiring terminals back to their original position on the servo drive.

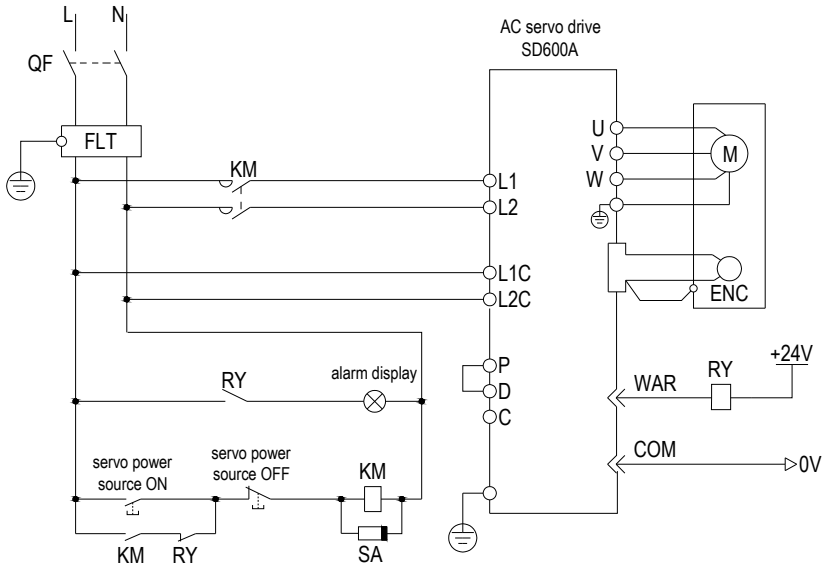


1. Do not turn on the power when wiring;
2. When inserting wires, do not short-circuit the adjacent wires.
3. The stripped wire ends should be covered tightly to ensure that no wire is exposed after inserting the terminals.

### 6.1.3 Typical main circuit wiring cases

The company's servo drive power connections can be divided into single-phase 220V, three-phase 220V and three phase 380V. Single-phase 220V is only allowed for models with 1.5Kw or less.

#### (1) Single phase 220V

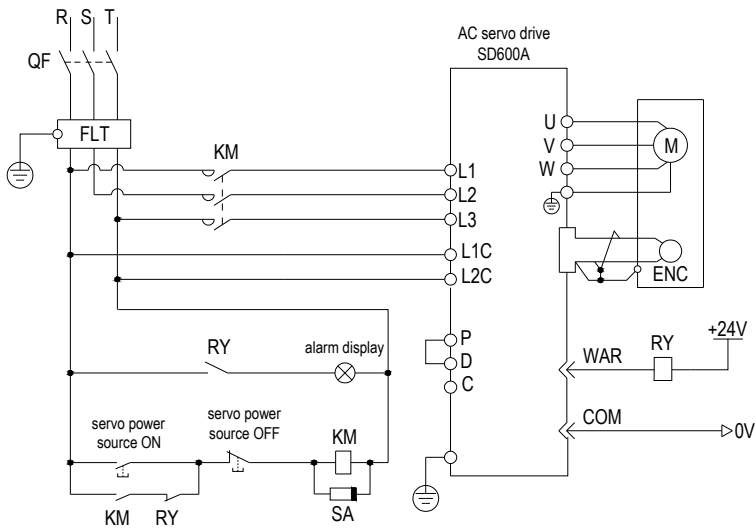


QF: Wiring Breaker  
FLT: noise filter

KM: AC contactor (maincircuit power supply)  
SA: Surge Suppressors  
RY: Relay



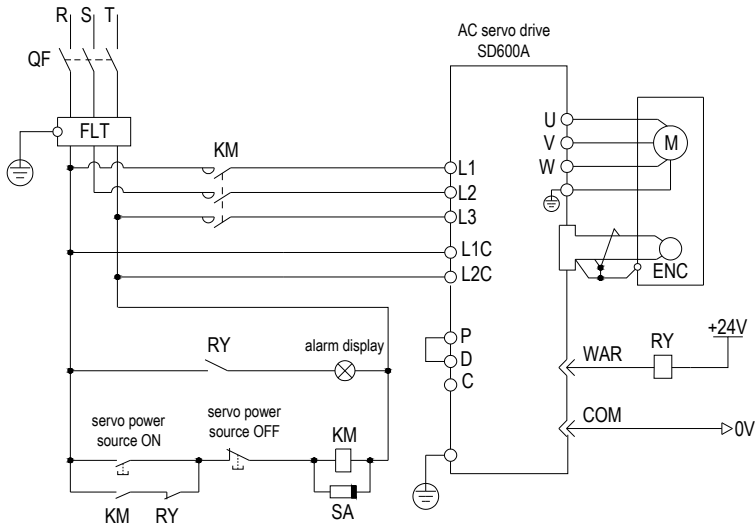
(2) Three phase 220V



QF: Wiring Breaker      KM: AC contactor (maincircuit power supply)      FLT: noise filter

SA: Surge Suppressors      RY: Relay

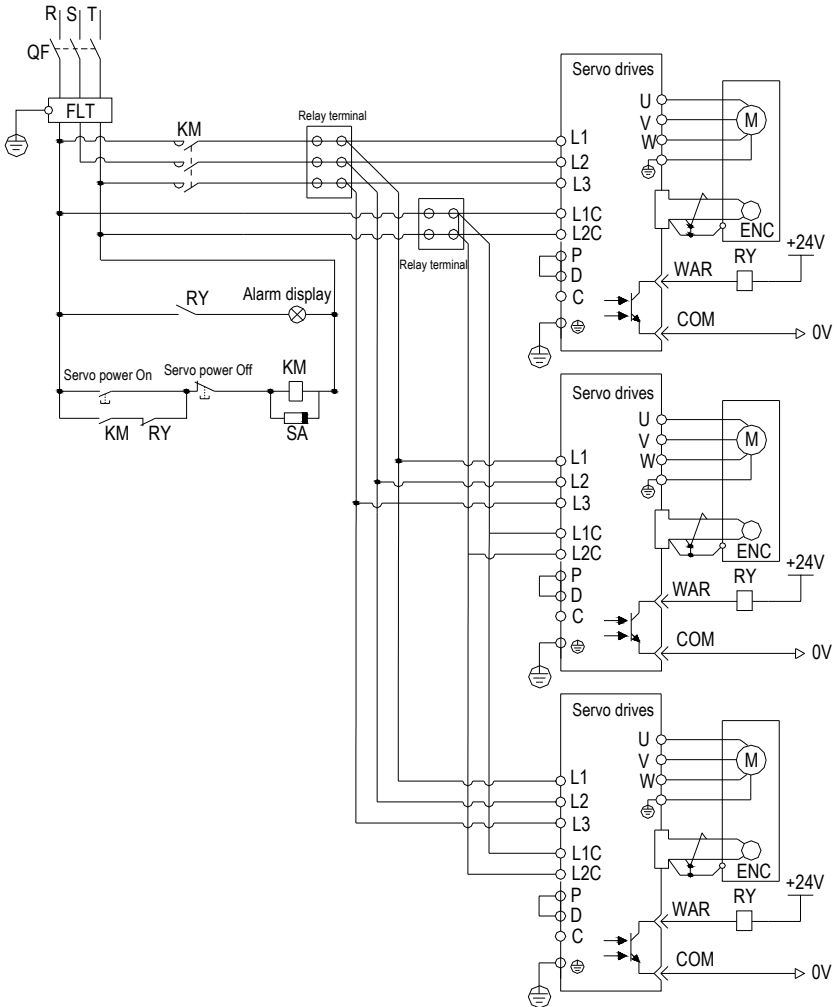
(3) Three phase 380V



QF: Wiring Breaker      KM: AC contactor (maincircuit power supply)      FLT: noise filter

SA: Surge Suppressors      RY: Relay

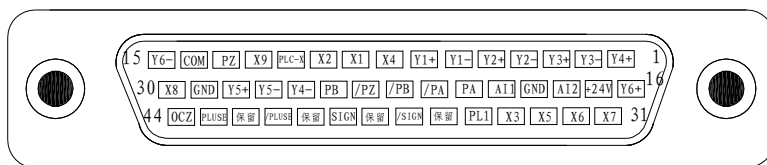
(4) Multi servo drive wiring



**6.2 CN1 input/output (IO) signal wiring**

Is more convenient with the host controller used in conjunction with the company's servo drives offer can plan and six of the nine input-output. The controller provides the function code parameter input setting nine and six output settings and parameters of Pr6.02 ~ Pr6.10 Pr6.22 ~ Pr6.27, in addition, it also provides encoder feedback signal differential output signals A +, A-, B +, B-, Z +, Z-, open collector output signal OCZ and analog input signal AI1, AI2. The pin is as follows:

## Servo drive terminal 44PIN terminal pins front view



1	Y4+	Digit output	16	Y6+	Digit output	31	X7	Digit input
2	Y3-	Digit output	17	+24V	+24V output	32	X6	Digit input
3	Y3+	Digit output	18	AI2	Digit input 2	33	X5	Digit input
4	Y2-	Digit output	19	GND	Analog signal place	34	X3	Digit input
5	Y2+	Digit output	20	AI1	Digit input 1	35	PL1	Instruction pulse public terminal
6	Y1-	Digit output	21	PA	Encoder A phase output	36	Reserved	
7	Y1+	Digit output	22	/PA	Encoder /A phase output	37	/SIGN	Position instruction pulse (-)
8	X4	Digit input	23	/PB	Encoder /B phase output	38	Reserved	
9	X1	Digit input	24	/PZ	Encoder /Z phase output	39	SIGN	Position instruction pulse (-)
10	X2	Digit input	25	PB	Encoder /B phase output	40	Reserved	
11	PLC-X	X public bias selection terminal	26	Y4-	Digit output	41	/PULSE	Position instruction pulse (-)
12	X9	Digit input	27	Y5-	Digit output	42	Reserved	
13	PZ	Encoder Z phase output	28	Y5+	Digit output	43	PULSE	Position instruction pulse (+)
14	COM	+24V power source place	29	GND	Analog signal place	44	OCZ	Z phase open collector output
15	Y6-	Digit output	30	X8	Digit input			

## Signal name and function of CN1 connector

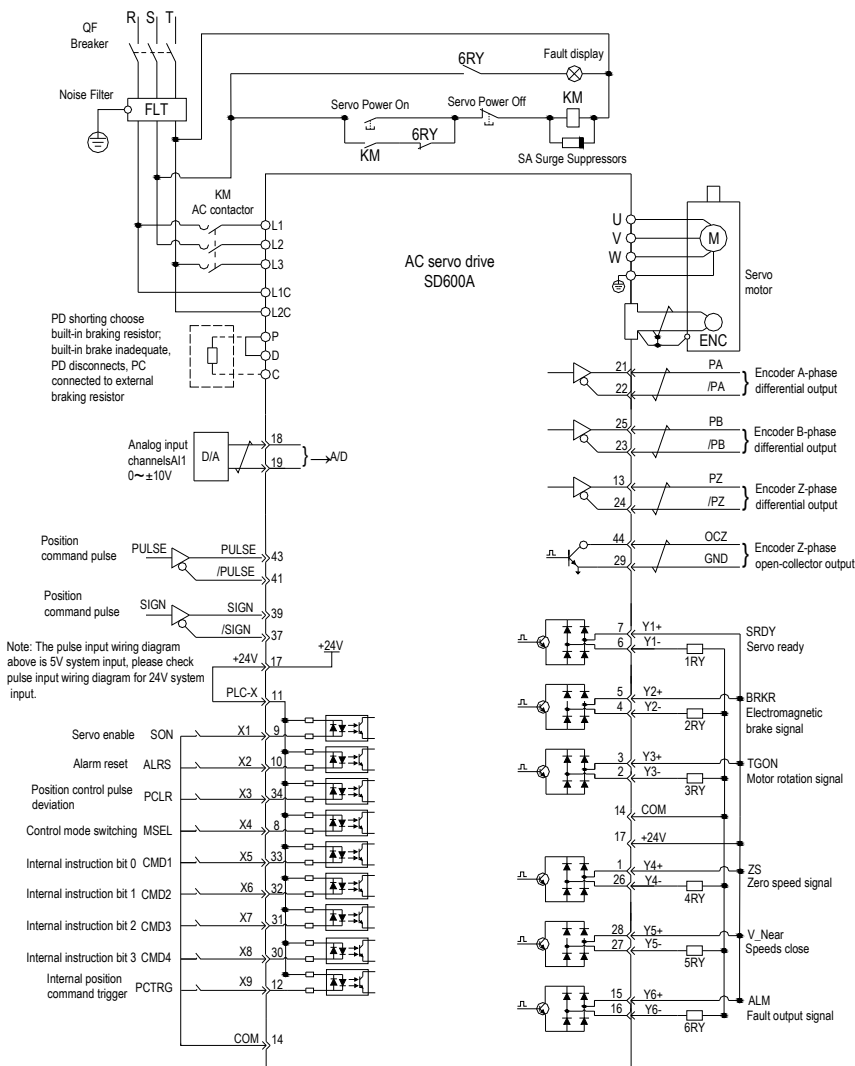
Signal name		Needle foot No.	Default function	Specification
Digital output terminal	X1	9	SON	Servo enables
	X2	10	ALRS	Alarm reset
	X3	34	PCLR	Position control pulse bias counter clear
	X4	8	SPDINV	Speed instruction direction selection

	X5	33	CMD1	Internal instruction bit0
	X6	32	CMD2	Internal instruction bit1
	X7	31	CMD3	Internal instruction bit2
	X8	30	CMD4	Internal instruction bit3
	X9	12	PCTRG	Internal position instructin trigering
	PLC-X	11		X1~X9 public bias selection terminal
Signal name		Needle foot No.	Default function	Specification
Programmable digital output terminal	Y1+	7	SRDY	Servo is ready
	Y1-	6		
	Y2+	5	BRKR	Magnetic brake output signal
	Y2-	4		
	Y3+	3	TGON	Motor rotary output signal
	Y3-	2		
	Y4+	1	ZS	Zero speed signal
	Y4-	26		
	Y5+	28	V_Near	Speed accessing signal
	Y5-	27		
	Y6-	15	ALM	Fault output signal
Y6+	16			

Signal name		Needle foot No.	Specification	
Position instruction input terminal	PULSE	43	Pulse mode: 1.pulse+direction 2.AB phase quadrature pulse 3.CW+CCW pulse Pulse signal: 1.differentialinput 2.open collector input	According to the actual needs of the user, select the differential input connection, open collector connection. Connection information, refer in this chapter: page 36 to 37 6.2.2 input and output signals (CN1) interface circuit
	/PULSE	41		
	SIGN	39		
	/SIGN	37		
	PL1	35		
Analog input terminal	AI1	20	Analog input signal, input range: 0~±10V	
	AI2	18	Analog input signal, input range: 0~±10V	
	GND	19,29	Analog signal place	
Encoder output signal	PA	21	Encoder A phase output(differential signal)	
	/PA	22		
	PB	25	Encoder B phase output(differential signal)	
	/PB	23		
	PZ	13	Encoder Z phase output(differential signal)	
	/PZ	24		
OCZ	44	Encoder Z phase open collector output signal		
Power source	+24V	17	Internal 24V power source for external use(COM place)	
	COM	14		

### 6.2.1 CN1 input/output(IO) connecting cases

#### (1) Position control mode



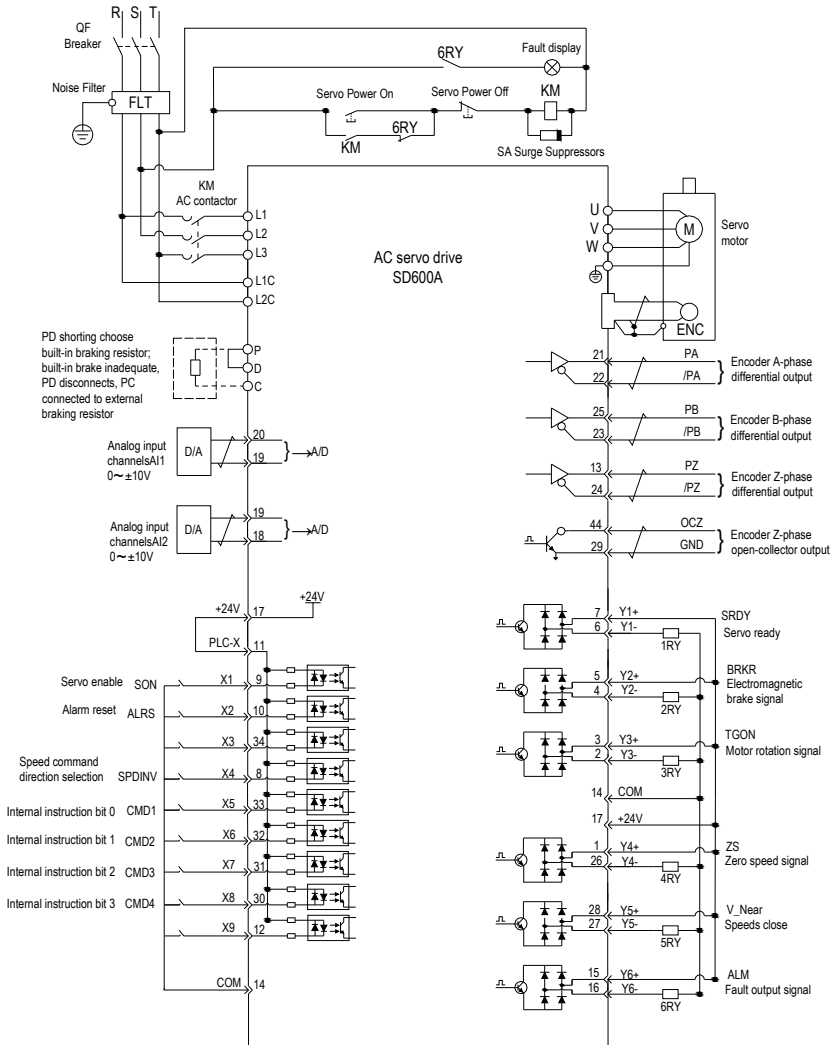
PD shorting choose built-in braking resistor; built-in brake inadequate, PD disconnects, PC connected to external braking resistor

Analog input channels A11 0~±10V

Note: The pulse input wiring diagram above is 5V system input, please check pulse input wiring diagram for 24V system input.

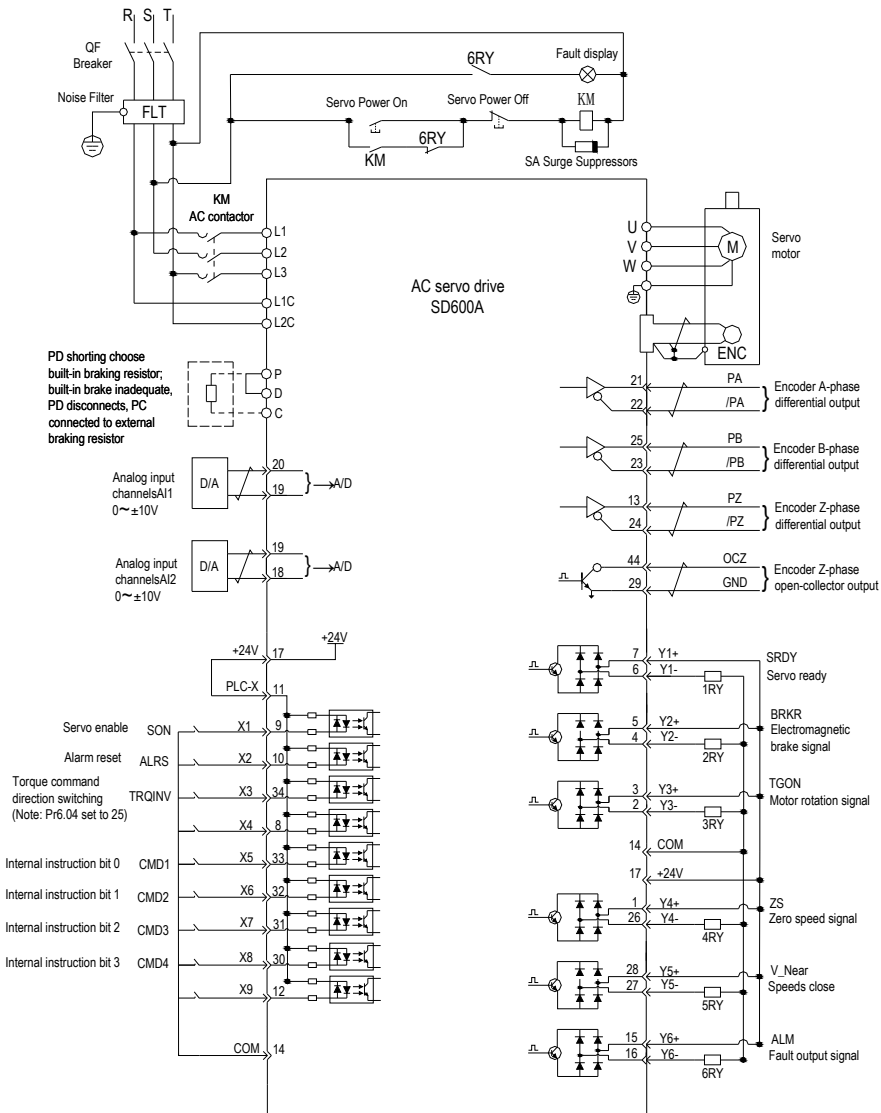
Note:  represents twisted pair

(2) Speed control mode



Note:  represents twisted pair

(3) Torque control mode



Note: ] represents twisted pair

## 6.2.2 Input/output signal (CN1) interface circuit

Servo drive input and output signals and the host device connection examples are shown below.

### (1) Digital value input circuit

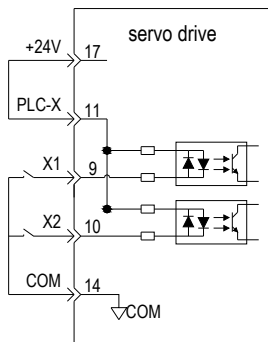
The following figures are the description of nine digital value input terminal of CN1 connector.

The company provides a total of nine X terminal for users, wherein each X port is available for users planning to use.

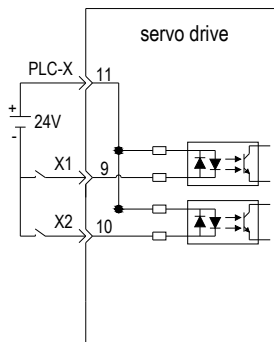
Digital input terminal has anti-reverse insertion function. Work principle is shown below, the two connection methods of all the digital input terminals are valid.

#### a, connection 1 (PLC-X connect positive power supply)

Using internal 24V power supply

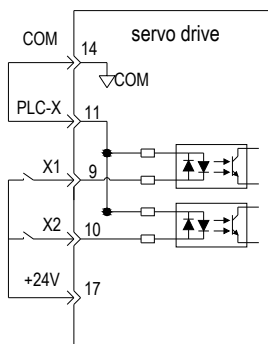


using external 24V power supply

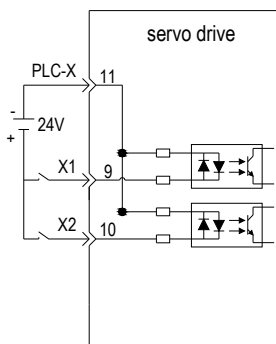


#### b, Connecting method 2(PLC-X connect negative power supply)

Using internal 24V power supply



using external 24V power supply

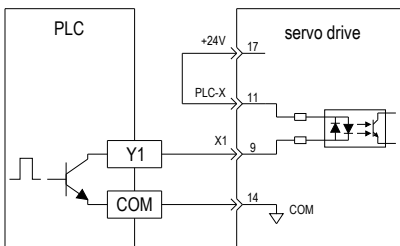




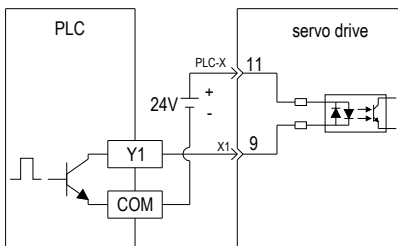
**c, connection with the host device example**

When the host device is a relay output:

Using internal 24V power supply

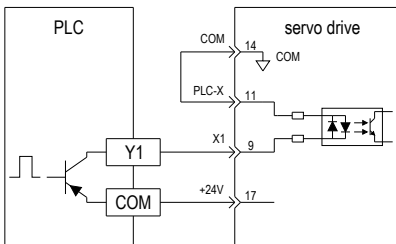


using external 24V power supply

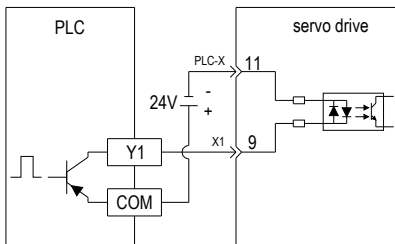


When the host device is an open collector output (sink output):

Using internal 24V power supply

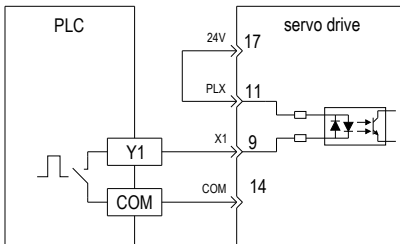


using external 24V power supply

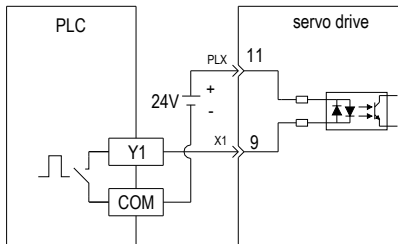


The host device is an open collector output (Source output):

Using internal 24V power supply



using external 24V power supply

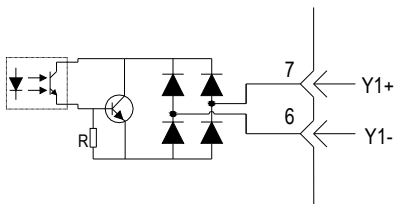


**When using external power, make sure the voltage <30V; otherwise it may damage the servo driver optocoupler.**

## (2) Digital output circuit

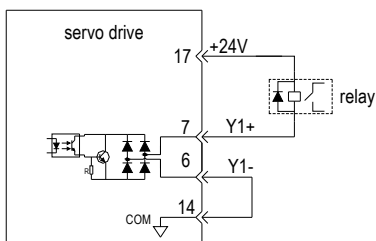
The following figures are the description of Y1 ~ Y6 six digital value input terminal of CN1 connector.

The company provides a total of six-way Y terminals for users planning to use and all of them are non-polar output: Y1 ~ Y6 principle diagram are shown as follows:

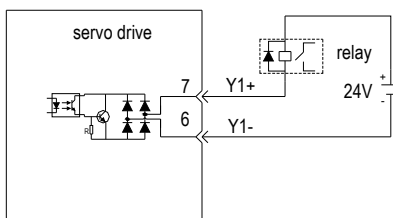


When the host device is a relay input:

Using internal 24V power supply

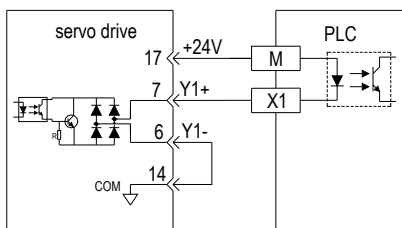


using external 24V power supply

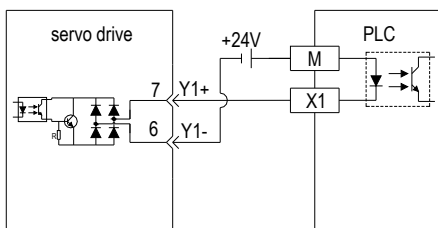


When the host device is an optocoupler input:

Using internal 24V power supply



using external 24V power supply



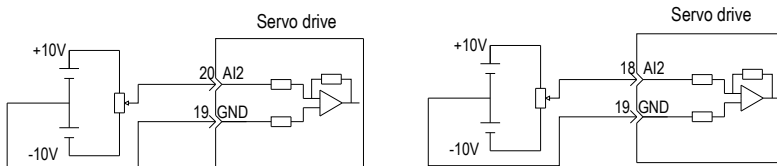
**Note 1:** regardless of polarity of Y1 + and Y1-, Y2 ~ Y6 connection method are the same as above.



- 1, when using an external power, make sure the voltage <math>< 30V</math>;
- 2, when Y1 ~ Y6 driving inductive loads, please install diode;
- 3, Y1 ~ Y6 allowable current <math>< 50mA</math>.

## (3) Analog input circuit

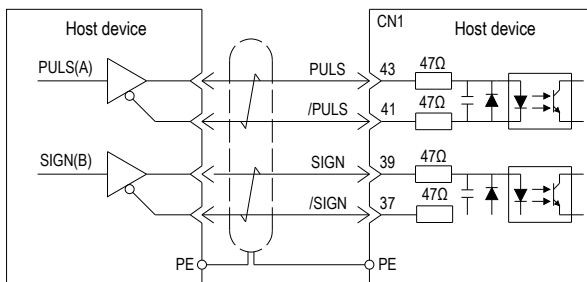
The servo drive of the company provides two analog input circuits. AI1 and AI2 analog channels are bipolar input, analog input voltage range:  $0 \sim \pm 10V$ , input impedance 10K. The input circuit is shown as follows:



## (4) Position command input circuit

The following figures are the description of the position command pulse input associated pin terminals (43,41,39,37,35) of CN1 connector.

The company's servo drives provide pulse command input (43,41) and pulse instruction symbol input (39, 37) terminal that can receive differential drive output signal and open collector output signals. For more information please refer to the function code Pr2.01 (External pulse command input form selection). According to the actual application requirements, correct wiring, wiring diagram is shown as follows:

**Connection method 1: differential mode (5V voltage input)**

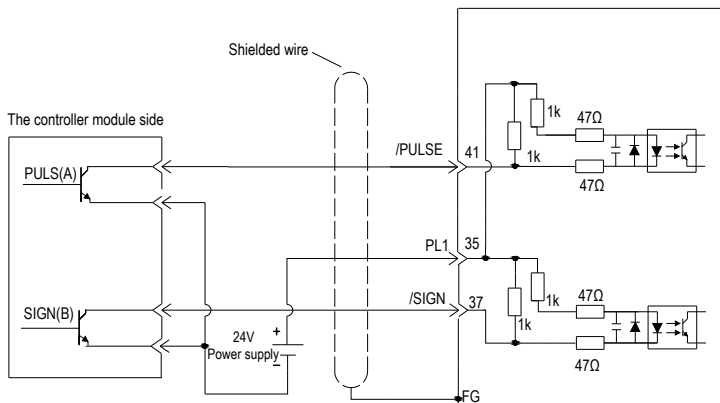
- Differential pulse input signal voltage  $\pm 5V$ , the maximum frequency: 500kHz;
- Differential pulse signal has the best noise immunity, it is recommended to use the mode in priority.



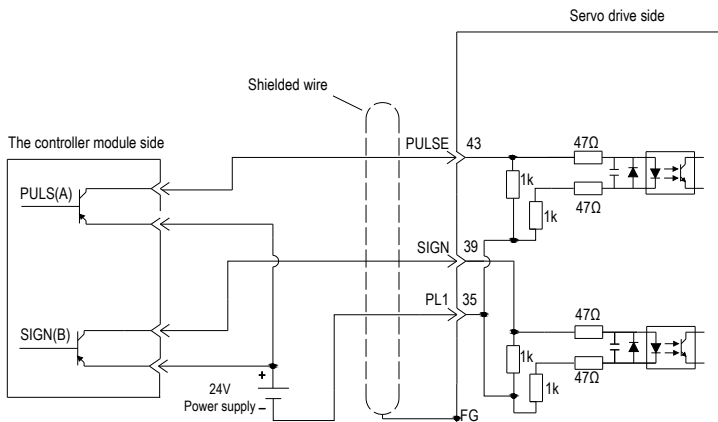
- 1, the circuit is 5V system, do not directly access 24V power supply;
- 2, please ensure that the differential signal current range is within  $8 \sim 10mA$ , if it can not meet the formula, the servo drive input pulse is unstable, the following conditions may occur:
  - a If input voltage position command pulse, pulse lost;
  - b if input position command direction, position command negated phenomenon.

**Connection 2: Open collector (24V input voltage)**

a. Control module is NPN model (common cathode)



b. Control module is PNP model (common anode)

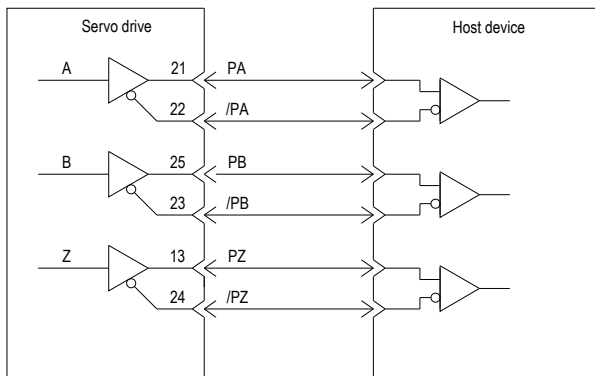



Maximum pulse input frequency of open collector is 200kHz; As shown above using an external 24V power supply, no external current limiting resistor needed. Generally Japanese PLC (such as Mitsubishi, Panasonic, Omron, etc.) Mostly NPN type, European-based PLC (such as Siemens, etc.) and the PNP in majority;

### (5) Encoder signal output circuit

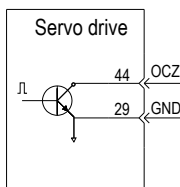
Here are the specification of CN1 connector pins 21-22 (Encoder A output), 25-23 (encoder B output), 13-24 (encoder Z output) terminals.

Encoder output circuit outputs differential signal through differential driver and at which time the host device constitutes a closed-loop position control, providing a feedback signal. The host device requires the use of a differential receiving circuit to receive signals. The circuit is shown as below:




 <b>NOTE</b>	<b>1 encoder differential signal output terminal, maximum allowable output current is 20mA.</b>
--	---

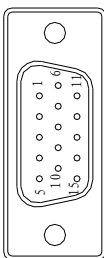
In addition, CN1 pin 44 (encoder Z open collector output), at which time the host device constitutes a closed-loop position control, providing a feedback signal. The host device requires the use of optocoupler and relay circuit to receive. The circuit is shown as below:



**Note:** encoder Z signal footnote function can not be distributed. Users do the wiring operation based on the actual condition.

 <b>NOTE</b>	<b>1 encoder Z signal open collector output port, maximum allowable output range: 30V, 100mA</b>
--	--

### 6.3 CN2 encoder signal wiring

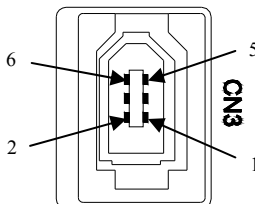


Servo drive terminal 15PIN terminal

Footnot	Mark	Content	Footnot	Mark	Content	Footnote	Mark	Content
1	PGA-	A-	6	PGA+	A+	11	PGW+	W+
2	PGB-	B-	7	PGB+	B+	12	PGW-	W-
3	PGZ+	Z-	8	PGZ+	Z+	13		
4	PGU-	U-	9	PGU+	U+	14	0V	0V
5	PGV-	V-	10	PGV+	V+	15	+5V	+5V

### 6.4 CN3 communication port signal wiring

The servo drive can be connected with the communication cable with the computer, and users can use the software provided by the company to make changes to the servo drive parameters. At the same time, users can connect the servo drive with the touch screen and the configuration software to monitor and operate the servo drive. We offer two interfaces: (1) CAN; (2) RS-485; Supporting multiple drive simultaneously connecting communication.

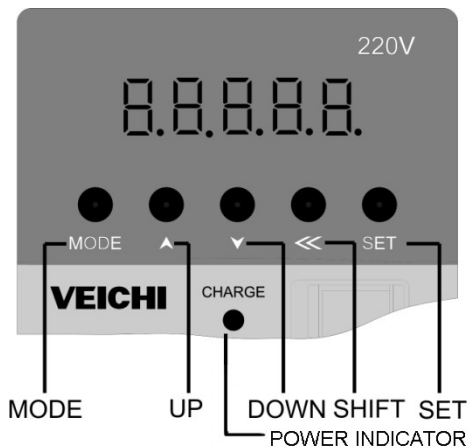


CN3 communication terminal pin definition

Pin No	Terminal	Function specification
1	CANH	Servo drives differential data transfer +terminal (CAN)
2	CANL	Servo drives differential data transfer - terminal (CAN)
3	CANG	CAN signal worksite
4	NC	Reserved
5	A+	Servo drives differential data transfer + terminal (RS-485)
6	B-	Servo drives differential data transfer - terminal (RS-485)

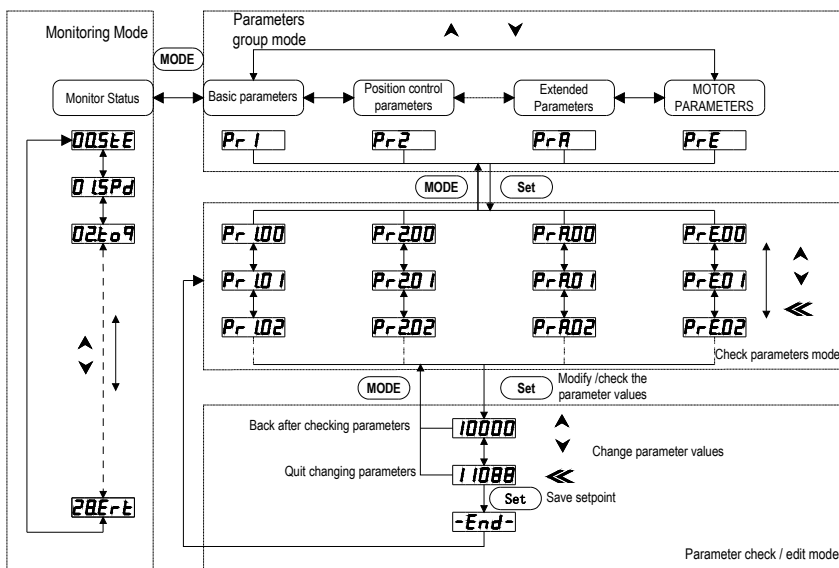
## Chapter 7 Panel Display and Operation

### 7.1 Panel name



Name	Function
LED display	Five group seven-segment display monitor for displaying the monitor value, parameter values and setting value
Power light	Charging display of the main power circuit capacity
MODE key	Enter parameter mode or out of parameter mode and setting mode
Shift key	Group mode code can be varied in parameter mode. In setting mode left moving of blinking character can be used to modify higher character setting value
UP key	Change monitor code, parameter code or setting
Down key	Change monitor code, parameter code or setting
SET key	Display and storage setting

## 7.2 Parameter setting process



Parameter setting process:

- (1) When the servo drive control board power supply is turned on, the panel displays the current drive series "600A" for one second, then enter into the monitor mode.
- (2) In monitor mode, press ▲ or ▼ to check the monitor parameter code; when displaying monitor parameter code without key operation, one second to enter into the parameter code automatic monitor display.
- (3) In monitoring mode, monitoring parameters for the 32bit or display value is greater than 5 binary value, press << key to toggle the display of high and low, when the display of high, the highest point on the LED digital tube.
- (4) In monitor mode, press the MODE key to enter the inter-parameter group mode, then press ▲ or ▼ to switch the group code, press the MODE key parameters from among the group mode back to monitor mode. When model parameters between groups, the absence of key operation, automatically enter the monitoring parameter digital display monitor after a minute.
- (5) When the group parameter mode, after switching groups required by ▲ or ▼, find the group, press the SET key to enter the code selection function within the group. After entering the group, or by ▲ ▼ to switch the function code within a group, need to find the function code, press the SET button, the system immediately enter setup mode. This parameter corresponds to the display at the same time setting will be displayed. In this case use ▲ or ▼ key to modify the parameter value, or press MODE key to exit setting mode and return to the parameter mode.



## 7.3 Status display

### 7.3.1 Function parameter change setting display

When pressing the SET button to change the storage setting value, LCD display will continue to display the setting state for 1 second based on the setting state.

Display symbol	Specification
<b>-End-</b>	Setting value correct storage ends
<b>Pa-On</b>	This parameter shall be valid after re-power
<b>SrUDn</b>	Parameters can not be modified when start the servo
<b>Err-r</b>	Read-only parameter, can not be modified
<b>rESud</b>	This parameter is reserved values that can not be modified or password input error

### 7.3.2 Fault and alarm display

Display content	Specification
<b>Er.002</b>	<p>Servo drive failure or alarm, drive five LED displays the fault or alarm message and the information content is displayed in the following format:</p> <p><b>Er.002</b></p> <p>— fault or alarm — 0:ault; E:alarm</p> <p><b>Note:</b> Fault or alarm number in the range of 01 ~ FF, specifically corresponding number fault or alarm please check the contents of the relevant sections. After the failure or alarm, press any button on the panel of the five in a duration of about 1 second, then the fault or alarm would flash at lowest digital tube decimal point until the fault or alarm eliminated.</p>
<b>12345</b>	<p><b>12345</b></p> <p>— Fault or alarm display with the lowest digit blinking decimal form — Symbol or parameter values</p>
<b>Er.---</b>	When no fault or alarm, display "Er.- - -".

### 7.3.3 Parameter display

Display example	Status specification
<b>12345</b>	Display a positive integer. Displayed value + 12345
<b>- 623</b>	The numerical display range is less than the five-digit number of negative displays. Displayed value-623
<b>37421</b>	The numerical display range is more than four-digit of negative display, the decimal of the two LED on the left is lighted on. Displayed value -37421

	When the value is greater than the range of five high five display. The highest point on the lower right position, expressing high five
	Decimal display. Displayed value 1234.5

### 7.3.4 Monitor parameter display

When the servo drive power is turned on, the display will show the monitor function codes for approximately one second, then enter into the monitor mode. In monitor display mode by pressing ▲ or ▼ to change the monitor display parameters, or directly modify the parameters to specify Pr1.03 monitor status. The setting of Pr1.03 will be the preset monitor code when the power is turned on. (Note: Do not set reserved value of Pr1.03 setting)

Pr1.03 setting	Symbol display	Content display	Content specification	Unit
0		Running state	Servo control circuit board electrified, but the control circuit is not powered on, the symbol is displayed; the main control circuit has powered on, but fault or alarm is displayed, the symbol is displayed.	-
			Control circuit board electrified and the main control circuit powered on, but the servo system is not in operation state; the symbol is displayed in S-off state.	-
			When the servo is running the symbol is displayed.	-
			When the servo is in the servo homing process.	-
1		Current actual speed of the motor	For example: 400 is displayed, it indicates that the current motor speed is 400rpm.	1rpm
2		Current actual torque of the motor	Expressed as a percentage of the rated torque. For example: Display 20.0, then the motor torque output is 20.0% of rated torque	0.1
3		Motor feedback pulse number (absolute value)	For example: When the value of 03.FbP is 2000 and 04.Fbp value is 3, the motor feedback pulse number $3 \times 10000 + 2000 = 32000$ Pulse;	1Pulse
4		Motor feedback rotation number (absolute value)	When the value of 03.FbP is 2000, 04.Fbv value is -3, the motor feedback pulse number $-3 \times 10000 + 2000 = -28000$ Pulse (reverse)	1Rev
5	Reserved			
6		Drive total electrifying running time	Drive electrifying running time	1min
7	Reserved			
8		External voltage command 1	For example: display 5250, represents an external voltage command to 5.25V	1mV

9	<b>09A12</b>	External voltage command 2	For example: display 5250, represents an external voltage command to 5.25V	1mV
10	Reserved			
11	<b>11Wdc</b>	Bus voltage value	For example: 315 is displayed, it indicates that the main control circuit voltage is 315V	1V
12	<b>12Ecl</b>	Phase current effectiveness	Effect value of current	0.01A
13	Reserved			
14	<b>14tEP</b>	IGBT module temperature	Current temperature of IGBT module	1°C
15	<b>15An9</b>	Current electricity angle	Current electricity angle, display range is 0~360°	0.1°
16	<b>16dl5</b>	Input signal monitor (X)	Show the actual digital input X terminal level.	-
17	<b>17do5</b>	Output signal monitor (Y)	Show the actual digital output X terminal level.	-
18	<b>18CPr</b>	Pulse bias	Control command pulse and feedback pulse number deviation	1Pulse
19	<b>19CP</b>	External pulse command input pulses	For example: When the value of 19.CP is 2000,20.CPs value is 3, the external pulse command input pulse number $3 \times 10000 + 2000 = 32000$ Pulse;	1Pulse
20	<b>20CPv</b>	External pulse command input pulse cycles	When the 19.CP value is -2000,20.CPv value is -3, the external pulse input command pulse number $-3 \times 10000 - 2000 = -32000$ Pulse (reverse) (Can be cleared by the function code Pr1.10)	1Rev
21	Reserved			
22	<b>22CPF</b>	Corresponding speed of input pulse command (signed)	Displays the external speed command input pulse with the symbol (symbol means direction)	1rpm
23	<b>23tP</b>	Current implement position, speed command section	Display internal multi-segment position or speed. For example, in position control mode, the display value is 5, which means the fifth internal position command is currently being executed. When in speed control mode, showing the currently executing the fifth internal speed command.	-
24	<b>24Ern</b>	Display fault code selected by Pr7.07	For example: Display Er.002, it indicates that the overcurrent fault.	-
25	<b>25Er5</b>	Display speed when Pr7.07 fault occurs	For example: Show 3000, indicates failure motor speed is 3000rpm.	1rpm

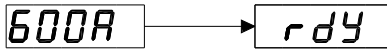
26		Display bus voltage when Pr7.07 fault occurs	For example: 300 is displayed, it indicates a fault when the main circuit voltage is 300V.	1V
27		Display the effective value of phase electricity when Pr7.07 fault occurs	For example: display 2, then the fault current is 2A.	0.01A
28		Display the time when Pr7.07 fault occurs	For example: Show 1600, it means the time when the failure occurred is the time after system start running 1600mins and fails.	1min

### 7.4 Panel using methods

#### 7.4.1 Initial state of panel display (7 step LED)

**State**

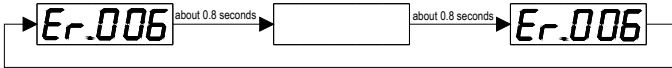
In default state (Pr1.03 = 0) the drive powered on, the panel LED display section shows as follows:



**Sending alarm**

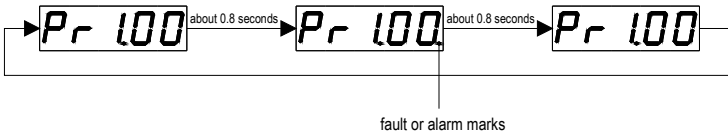
When the driver alarm, front panel display is shown as follows:

When alarm, repeat the following displays (0.8 seconds display / 0.8 seconds no display).



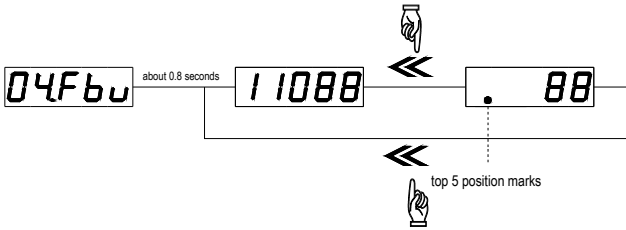
When the drive alarms, the user presses any key on the panel for about 0.8 seconds, the alarm unit front panel display as follows:

Press any key for 0.8 seconds, the alarm to the far right of the decimal point digital tube display (0.2 seconds display / 0.2 seconds no display)

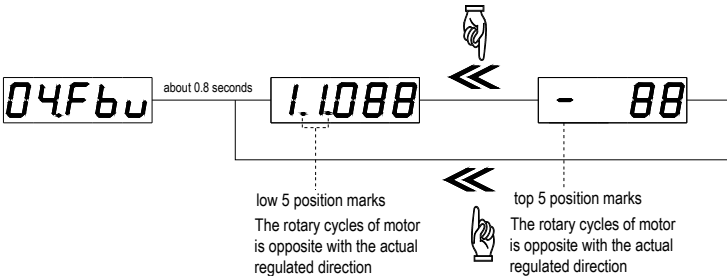


### 7.4.2 Monitor parameter display (part)

Motor feedback rotation number display [represents the motor rotated counterclockwise circle 8811088 (Pr1.02 = 0)]

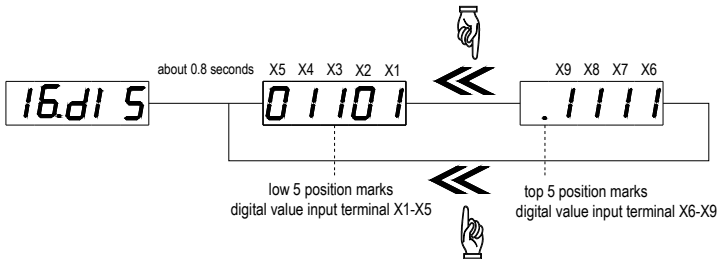


When the rotating direction of the motor feedback direction is opposite with the predetermined number, the recorded rotation cycle is negative [which represents the motor rotated clockwise 8,811,088 circle (Pr1.02 = 0)]



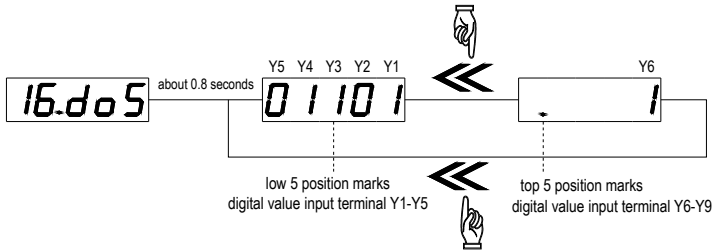
#### (1) Digital input X terminal status display

In monitor mode, by turning the UP or DOWN keys to find **16.d1 5**, or setting its parameters by Pr1.03 to 16, and then returns to the monitoring mode, the digital input status can be diagnosed. There're totally 9 groups X terminal, performing five level switching by . Its display mode is bit, it would trigger when it is 0.



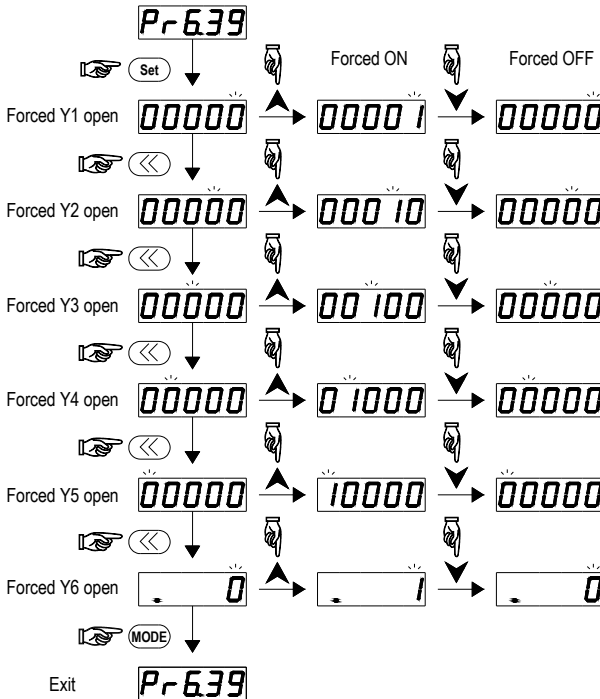
#### (2) Digital input Y terminal status display

In monitor mode, by turning the UP or DOWN keys to find **17.do 5**, or setting its parameters by Pr1.03 to 17, and then return to the monitoring mode, the digital input status can be diagnosed. A total of six groups Y terminals switching by . Its display mode is bit, it would trigger when it is 0.



**(3) Digital output diagnosis operation**

Users can diagnose digital output terminal through function code Pr6.39, facilitating the actual line related tests. After entering the function code Pr6.39 setting mode, press <<, ▲, ▼ keys to implement Y1 ~ Y6 forced ON or OFF.  
 Note: regardless of the logic Pr6.21 set level. After exiting Pr6.39, forced Y1 ~ Y6 state fail, the actual distributed Y port function status is valid.

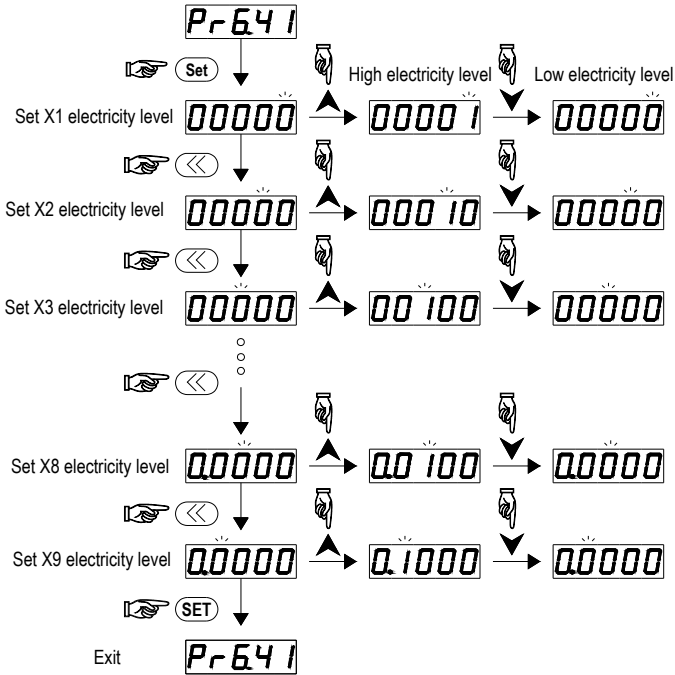


**(4) Analog digital input X terminal operation**

When input terminal (X1- X9) and external device are not connected, the user can simulate and achieve external digital input by the function code Pr6.41. First switch by using the internal X terminals (Pr6.40 = 1) by function code Pr6.40, then set high and low state of X1 - X9 by function code Pr6.41, users can also do appropriate action on function code Pr6.41 by PLC and man-machine interface. After entering the function code Pr6.41 setting mode, according to actual needs, the user can set the level of X1 ~ X9 by <<, ▲, ▼, SET key to 0 or 1, and after setting up a virtual terminal (X1

~ after X9) high and low level, you can view the current level of X terminal by monitoring the state of the parameter 16.DIS. In addition, when users operate virtual terminal by communication, the corresponding parameter values can be written to function code Pr6.41 address, for example, when X6 terminal 1 is set to a high level, then write the set value 0x0020.

Note: For edge trigger signal, such as the rising edge signal, when set to high level valid (Pr6.01), the current level of corresponding virtual X terminal status is 0, and when it is set to 1, a valid rising edge signal would be generated; if the current level is 1, then you need set the X terminal level to 0, and then re-set to 1, then generate a valid rising edge signal.



## Chapter 8 Maintenance and Inspection

### 8.1 Abnormality diagnosis and treatment measures

The company's servo drive alert level is divided into two levels:

Level 1: Fault, the servo drive has a serious alarm, does not work normally, which need to stop, Y terminal outputs signal ALM (assignment required).

Level 2: Warning, the servo drive has not very serious warning, which temporarily does not cause damage to the drive, but it could turn into alarm level 1 if not treated in time, Y terminal output signal WARN (assignment required).

After eliminating cause of the alarm, users can clear the warning alarm by X terminal ALRS (assignment required).

### 8.2 Alarm display checklist

#### (1) Fault display checklist

Symbol	Alarm name	Alarm content	Type
<b>Er.001</b>	Hardware protection	Detecting short-circuit protection device	No reset
<b>Er.002</b>	HOC	Detecting overcurrent protection of power device	No reset
<b>Er.003</b>	AD Initialization failure	AD module initialization calibration abnormal	No reset
<b>Er.004</b>	Parameter storage fault	Eeprom Storage abnormal or frequent storage	No reset
<b>Er.005</b>	AD Sampling module fault	AD switch fault ( Deviation is too large or the conversion timeout )	No reset
<b>Er.006</b>	Encoder abnormal 1	Encoder wire break	No reset
<b>Er.007</b>	Encoder abnormal 2	Encoder abnormal when running ( AB signal disturbed or abnormal )	No reset
<b>Er.008</b>	Encoder abnormal 3	Encoder abnormal when running ( z signal disturbed or abnormal )	No reset
<b>Er.009</b>	Undervoltage	AC220 supply, bus voltage < 180V DC AC380 supply, bus voltage < 380V DC	Can reset
<b>Er.00A</b>	overvoltage	AC220V supply, bus voltage > 400V DC AC380V supply, bus voltage > 760V DC	Can reset
<b>Er.00b</b>	System fault	Servo drive internal fault	No reset
<b>Er.00c</b>	Motor overload	Motor rated load exceeds 120% or more over for a certain time	Can reset
<b>Er.00d</b>	Drive overload	Drive rated load exceeds 110% or more over a certain time	Can reset
<b>Er.00E</b>	Drive overheat	Servo drive overheat	Can reset



<b>Er.00F</b>	Encoder UVW signal abnormal	Encoder UVW signal abnormal or break wire	No reset
<b>Er.010</b>	Over speed	Motor speed exceeds the maximum speed of the motor	Can reset
<b>Er.011</b>	Excessive position deviation	Positional deviation exceeds the configured setpoint deviation (Pr2.18)	Can reset
<b>Er.012</b>	XTerminal allocation failure	A plurality of X terminals assigned the same function	No reset
<b>Er.013</b>	YTerminal allocation failure	A plurality of Y terminals assigned the same function	No reset
<b>Er.014</b>	Serial communication timeout	Communication is not connected to the host device	Can reset
<b>Er.015</b>	Power source fault	External power supply L1C, L2C abnormal	Can reset
<b>Er.016</b>	Homing Failed	Origin search failed	Can reset
<b>Er.018</b>	The system does not match	Voltage or current servo drives and motors do not match	No reset
<b>Er.019</b>	Motor ID Number Exception	The servo drive does not drive the motor with the ID number	No reset
<b>Er.01A</b>	ADCalibration error	Servo drives automatic correction of analog channel offset	Can reset
<b>Er.020</b>	FPGA fault	CPU FPGA data reading abnormal	Can reset
<b>Er.021</b>	Encoder conneting fault	ID number and the actual connection of the motor does not comply	Can reset
<b>Er.023</b>	DSP running abnormal	DSP is detected or the programming process did not work	No reset



- 1, No reset alarm type means after a system failure, even if the fault can not be ruled out by X terminals or cleared by Pr7.08 function code, it must be re-powered.
- 2, Can reset alarm type means after a system failure, after troubleshooting, you can clear X terminals or Pr7.08 and do not need to re-power.

## (2) Warning display list

<b>Er.E01</b>	Drive overheat warning	Servo drive main circuit (IGBT) temperature reaches the overheating fault.	After warning eliminate, LED alarm display is automatically eliminated.
<b>Er.E02</b>	Motor overload warning	Will reach motor overload inverse time curve.	
<b>Er.E03</b>	Drive Overload Warning	Will reach servo drive overload inverse time curve.	
<b>Er.E04</b>	Excess position deviation warning	Deviation counter droop pulse emitted outside the warning range.	
<b>Er.E06</b>	Forward overtravel warning	Action when forward limit switch is pressed.	
<b>Er.E07</b>	Reverse overtravel warning	Action when reverse limit switch is pressed.	
<b>Er.E08</b>	Emergency Brake Warning	Action when emergency braking switch is pressed.	

## 8.3 Fault Causes and Treatment

Servo drive in case of failure, it will display "Er. xxx" on drive panel display, fault indication and treatment measures are as follows.

Fault code	Cause	Treatment measure
<b>Er.001</b> SC	Detect short-circuit protection device	Check the wiring status of motor and drive or short circuit body short or not, excluding short-circuit state and avoid metal conductor being exposed; Check the wiring sequence of motor and the servo drive is the same as described in the wiring order to ensure the same wiring sequence;
<b>Er.002</b> HOC	Power device overcurrent detected	Please check whether the set value is much larger than the factory preset value, if it is much larger than the factory preset, then gradually recover the amount of modification; Please check whether the command control input changes too intense, too intense changes in the rates of change Please correct the input commands or open the corresponding filter function; Re-power, if there's still problem after multiple re-power, replace the drive, or look for technical support.
<b>Er.003</b> AD initialization fault	AD initial calibration module fault	Re-power, if there's still problem after multiple re-power, replace the drive, or look for technical support.

<p><b>Er.004</b> Abnormal parameter storage</p>	<p>Eprom memory storage or frequent abnormal</p>	<p>Please check whether the host device frequently modified servo drive function parameters, if so, please change the parameter write method and re-writing; Please arbitrarily modify a parameter and then re-power to see if the parameters are saved and, if not, please save again after power on if there are still many problems, replace the drive, or ask for technical support.</p>
<p><b>Er.005</b> ADSampling module fault</p>	<p>Deviation is too large or the conversion timeout</p>	<p>Please check whether the drive servo drive side is not enabled when a current output, analog sampling voltage is abnormal or not; Check the U-phase, V-phase, W-phase wiring is correct or not, to ensure compliance with the relevant requirements of wiring, re-seated cable; Re-power, if there's still problem after multiple re-power, replace the drive, or look for technical support.</p>
<p><b>Er.006</b> Encoder abnormal 1</p>	<p>Encoder disconnection</p>	<p>Please check the encoder U, V, W, A, B, Z wiring is correct or not; Please check the encoder connection joint is solid or not; Please check the encoder signal line is relevant and correct welding; Please check the motor type (function code PrE.04) on the motor nameplate ID number is the same or not; Re-power, if there's still problem after multiple re-power, replace the drive, or look for technical support.</p>
<p><b>Er.007</b> Encoder abnormal 2</p>	<p>Encodr AB disturbed</p>	<p>Check encoder wiring is solid or not; Check whether the encoder has mask processing or not; Check to see if the encoder AC power line along the alignment or not; Re-power, if there's still problem after multiple re-power, replace the drive, or look for technical support.</p>
<p><b>Er.008</b> Encoder abnormal 3</p>	<p>Encodr z disturbed</p>	<p>Check encoder wiring is solid or not; Check whether the encoder has mask processing or not; Check to see if the encoder AC power line along the alignment or not; Re-power, if there's still problem after multiple re-power, replace the drive, or look for technical support.</p>
<p><b>Er.009</b> Undervoltage</p>	<p>Main circuit input voltage is below the permissible rated voltage</p>	<p>Check the main circuit input voltage wiring is correct or not, reconfirm the wiring.</p>
	<p>No main circuit input voltage source</p>	<p>Please check the main circuit voltage is normal or not .</p>
	<p>Power input error</p>	<p>Please check the power supply system is consistent with the specifications defined, make sure that the correct voltage source.</p>

	Servo drive failure	Re-power, if there's still problem after multiple re-power, replace the drive, or look for technical support.
<b>Er.00A</b> Overvoltage	AC220V servo drives detected DC link voltage exceeds 400V; AC380V servo drives detected DC link voltage exceeds 760V	Measure the power supply input voltage, AC power supply voltage is adjusted within the range of product specifications.
	Power supply voltage is unstable, or struck by lightning	Measuring the mains voltage, improve power supply situation, and then set the power surge suppressors, and if alarm still occurs, there may be a servo drive fault, repair or replace the servo drive.
	Drive hardware failure	Check the main circuit input voltage, if alarm still occurs within the rated allowable range, repair or replace the servo drive.
	Rapid deceleration	Check whether the load inertia is large, overvoltage during deceleration, please check if installed regenerative resistor.
<b>Er.00B</b> System fault	EEPROM fault	Re-power, if the alarm still occurs, there may be a servo drive fault, repair or replace the servo drive.
	Function code parameter error	After restoring factory value, if the alarm still occurs, there may be a servo drive fault, repair or replace the servo drive.
<b>Er.00C</b> Motor overload <b>Er.00D</b> Drive overload	continuous using Exceed the rated load servo drive	Please set the parameters to 2 by Pr1.03 and return to check the monitor whether mode value of the actual torque 02.Toq been greater than 100. If greater, increase the motor capacity or decrease the load.
	Motor, encoder wiring error	Check the motor and encoder wiring errors.
	Motor stuck	Check whether the motor has a stall.
	Heavy load	Increase motor capacity.
	Motor overload point setting error	Detect if Pr7.03 set is too low.
	The motor (drive) run over overload protection feature	Confirm the motor or servo drive overload characteristics and operating instructions, re-change load conditions, operating conditions and motor capacity.
	Servo drive failure	Re-power, if there's still problem after multiple re-power, replace the drive, or look for technical support.
<b>Er.00E</b> Drive overheat	High working environment temperature	Measuring environment temperature, based on the environment temperature to improve the working environment.
	Installation direction of servo drives and unreasonable connection with other devices	Check if the servo drive installation conform to the relevant regulations.
	Drive overtemperature point is not set correctly	Please check the function code Pr7.06 parameter values are correct.
	Servo drive fan abnormal	Re-power, if there's still problem after multiple re-power, replace the drive, or look for technical support.

<b>Er.010</b> Over speed	Servo motor UVW wiring serial error	Check the motor wiring, motor wiring confirm if there are problems.
	Speed command input value exceeds the overspeed value	Make sure the speed command input, reduce instruction value or gain.
	Motor speed overshoot	Check the motor velocity waveform, reduce the regulator gain.
	Function zero electrical angle (PrE.28) and encoder offset angle (PrE.29) settings are correct or not	Please check whether the two function codes are factory set value, and restore them to factory set value.
	Servo drive fault	Re-power, if there's still problem after multiple re-power, replace the drive, or look for technical support.
<b>Er.011</b> Excess position deviation	Servo motor UVW connection is correct or not	Check motor wiring main circuit cable, confirm whether there's motor cable or encoder cable poor contact problem.
	Motor overload causes the motor to stuck	Check if the transmission belt or chain is too tight or if the table reaches the boundary or obstacle.
	Servo drive slow response time resulting in the number of droop pulses is too large	Increase the position loop gain parameter (Pr5.00) or position loop feedforward gain (Pr5.06) .
	Position command pulse frequency is too high	Try to reduce instruction frequency, the instruction acceleration or electronic gear ratio and then run.
	Position command acceleration is too large	Join the position command acceleration and deceleration time smoothing parameter, and reduce the lowered position command acceleration and then run.
	position error value (Pr2.18) is not set correctly	Please follow the set position error value (Pr2.18) correctly.
<b>Er.012</b> XAllocation Fault	Servo drive fault	Re-power, if there's still problem after multiple re-power, replace the drive, or look for technical support.
	A plurality of X terminals assigned the same function	Please check if the function code of many X terminals are the same in Pr6.02 ~ Pr 2.10 to ensure that the function codes are different.
<b>Er.013</b> YAllocation Fault	A plurality of Y terminals assigned the same function	Please check if the function code of many Y terminals are the same in Pr6.22 ~ Pr6.27 to ensure that the function codes are different.
<b>Er.014</b> Communication timeout fault	Long time not receiving communication command	Please check the function code parameter value Pr8.04 settings are correct.
<b>Er.015</b> Power	Power supply Fault	Please check the value of the parameter function code Pr7.19 settings are correct.

supply Fault		Check if the main circuit terminals L1C, L2C are bad. Indeed after the access to power, while still abnormal, return to the dealer or factory overhaul. Make sure that the value set Pr2.24 not too small.
<b>Er.016</b> Homing Failed	When you enable homing function within the set time Pr2.24, the origin point cannot be detected.	Make sure that the value set Pr2.24 not too small. Make sure that the zero signal (ORGP or motor Z signal) is valid.
<b>Er.017</b> Dynamic braking close	Dynamic braking system has shut down during operation	After clearing the fault re-run several times, rerun still reported the fault, return it original dealer or repair.
<b>Er.018</b> System does not match	Servo drive voltage and motor voltage rating does not match	Check to see if the servo drive and motor are 220V or 380V.
	Servo drive rated current and the rated current of the motor does not match	Check if the servo drive rated current and the motor rated current matches, allowing only the drive rated current is greater than or equal to the rated motor current.
<b>Er.019</b> Motor Idnumber abnormal	The servo drive does not recognize the ID number of the servo motor	Check to see if the ID number on the motor nameplate is the same with the values in the servo drive PrE.04; Check the motor parameters set custom meets the practical requirements.
<b>Er.01A</b> AD correction abnormal	When the servo drive is set to automatic correction of analog channels (Pr6.38 = 1/2) Offset value failed	Please check if there's voltage input during automatic calibration for analog input channels; Make sure the analog AI1, AI2 correction when the external input voltage is 0V.
<b>Er.020</b>	DSP FPGA for data read is not normal	Repeat power-detect, if this fault occurs every time when power on, it means the FPGA between DSP and FPGA signal abnormality or abnormal connection
<b>Er.021</b>	Servo drive encoder signals detected abnormal.	Check PrE.04 motor ID number is consistent with the ID number on the actual motor nameplate or not, the cause of the alarm is that the drive motor ID number is for the non-line encoder motors, while the actual connection is not that type of line encoder motor.
<b>Er.023</b>	DSP running abnormal	Repeat power-detect, if this fault occurs every time when power on, it means DSP abnormal or signal connection abnormal between DSP and FPGA.

## 8.4 Other conditions and treatment measures

Bad condition	Cause	Check methods	Treatment measures
		■ Please inspect and handle after setting the servo drive power to OFF	
Servo motor does not start	Control power is not on	Check the control voltage between the power supply terminal	Correct control power ON circuit
	Main circuit power is not on	Check the voltage between main circuit power supply terminals	Correct main circuit power ON circuit
	Input Output (CN1 connector) wiring error or off	Check CN1 connector installation, wiring	Properly installed wiring connector CN1
	Servo motor, encoder wiring off	Inspect lines and wiring	Wiring is properly connected
	Overload	No-load test run	Reduce the load, or use a larger capacity servo motor and drive
	No input speed / position command	Check input speed / position command signal	Enter the correct speed / position command signal
	Encoder type is different from the setting of user parameters	Check encoder type being used	Correctly set the encoder type (PrE.25)
	Servo ON (SON) input remains OFF	Confirm terminal setpoint input parameters	Correctly terminal input parameter setting, the servo ON (SON) input is set to ON
	Speed control: Speed command input inappropriate	Confirmation control mode (Pr1.00) are consistent with the input	Right control parameter settings or input
	Torque control: Torque command input inappropriate	Confirmation control mode (Pr1.00) are consistent with the input	Right control parameter settings or input
	Position control: command pulse input inappropriate	Check (Pr2.01) the reference pulse form or sign + pulse signal	Right control parameter settings or input
	Forward drive prohibited (P-OT), reverse drive prohibited (N-OT) input signal remains ON state	Check the P-OT or N-OT input signal	Set P-OT and N-OT input signal to OFF
Servo drive failure	Servo drive circuit board failure	Change servo drive	

Servo motor stops running after a momentary moving	Motor wiring error	Check the motor wiring	Correct motor wiring
	Encoder wiring error	Check encoder wiring	Correct encoder wiring
Rotatory instability of the servo motor	Poor wiring contact of servomotor	Unstable connection between power lines (U, V, W-phase) and connector encoder	Tighten and re-handling terminal and connector loose fastening parts
Servo motor rotates when there's no command	Speed control: Speed command input inappropriate	Confirm control mode (Pr1.00) are consistent with the input	Right control parameter settings or input
	Torque control: Torque command input inappropriate	Confirm control mode (Pr1.00) are consistent with the input	Right control parameter settings or input
	Speed command offset	Adverse offset adjustment of servo drive	Bias adjustment of servo drive
	Position control: the pulse input command inappropriate	Check (Pr1.01) instruction pulse form or symbol + pulse signal	Right control parameter settings or input
	Servo drive failure	Servo drive circuit board failure	Replace the servo drive
Abnormal noise of servo motor	Poor mechanical installation	Servo motor mounting screws loose	Re-tighten the mounting screws
		Whether the coupling axis misalignment	Aligned with the axis of the coupling
		Coupling out of balance	Ensure coupling balance
	Bearing abnormal sound	Check bearing surrounding sound, vibration condition	If unusual, please contact our service department
	different specifications of input signal lines, being disturbed	Shielded twisted pair cable, core wire 0.12mm <sup>2</sup> or more, and consistent specifications, using of tinned copper shielded twisted pair cable	Input signal line specifications meet the requirements
	Length of input signal wire exceeds using range, being disturbed	Confirm longest wiring length is 3m. Impedance of 100Ω or less	The length of the input signal line meets the requirements
	Encoder signal line different specifications, disturbed	Shielded twisted pair cable, core wire 0.12mm <sup>2</sup> or more, and consistent specifications, using of tinned copper shielded twisted pair cable	The encoder signal line specifications meet the requirements
	Length of input signal wire exceeds using range, being disturbed	Confirm longest wiring length is 20m	The length of the input signal line meets the requirements




	Encoder cable damage, being disturbed	Encoder cable producing biting, skin damage, signal lines being disturbed	Replace encoder cable laying and revise the way
	The potential of the ground terminal of servo motor changes due to the influence of equipment on servo motor side (welding, etc.)	Confirm servo motor side, welding ground state (not grounded, not totally grounded)	Connect the device ground, so as not to split the encoder signal line
	Interfere with the servo drive pulse count error	Encoder signal line being disturbed	Implementation of the encoder signal line anti-jamming measures
	Encoder is subject to excessive vibration, shock	Mechanical vibration or poor motor mounting (mounting surface accuracy, fixing, eccentric)	Reduce mechanical vibrations, and install servo motor according to specifications
	Encoder failure	Encoder failure	Replace servomotor
vibration of the servo motor 200 ~ 400Hz frequency	Position loop controller proportional gain (Pr5.00) set too high	Factory setting: 20.0Hz, please refer to the user manual for gain adjustment	Correct position loop regulator proportional gain (Pr5.00) setting
	Position loop feedforward gain regulator (Pr5.06) set too high	Factory setting: 0.0Hz, please refer to the user manual for gain adjustment	Correctly position loop feedforward gain (Pr5.06) setting
	Speed loop gain (Pr5.01) set too high	Factory setting: 200.0Hz, please refer to the user manual for gain adjustment	Correctly bit rate gain (Pr5.01) setting
	Speed loop integral time (Pr5.02) set incorrectly	Factory setting: 40.00ms Please refer to the user manual for gain adjustment	Correct speed loop integral time (Pr5.02) setting
	Load inertia ratio (Pr5.29) set incorrectly	Check the load inertia ratio parameter (Pr5.29)	Calibration Load inertia ratio (Pr5.29) setting

## 8.5 Servo maintenance and inspection

The servo system is composed of many parts and only if all parts work normally, the device can play proper function. For mechanical parts and electronic components, depending on using conditions, some parts need maintenance. There must be periodic inspection or replacement to ensure the servo motor and its servo drive can run for a long time.

### 8.5.1 Servo motor repairment

Since there's no electric brush for AC servo motor, so routine maintenance is enough; the maintenance period in the table is substantially standard. According to using environment to judge and determine the most appropriate maintenance period

 <b>NOTE</b>	Do not dismlele servomotor for maintenance or inspection. When removing the servo motor, please contact our support agents or technology department.
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Items	Inspection time	Inspection, maintenance essentials	Note
Confirm vibration and sound	Every day	Tactile and auditory judgment	No increase compared with the usual
Exterior Maintenance	According fouling situation	Wipe clean with a cloth or with an air gun	-
Insulation resistance measurement	At least once a year	Cut off the connection with the servo unit, using 500V megger to measure insulation resistance. Resistance exceeds 10MΩ means normal	When 10MΩ or less, please contact our service department.
Replace oil seal	At least every 5000 hours	Please contact our agents or technical support	Only for servo motor with an oil seal
Comprehensive overhaul	At least 20,000 hours or five years		-

### 8.5.2 Servo drive repairment

The servo drive unit does not need routine maintenance, but please do overhaul more than once each year.

Items	Inspection time	Inspection, maintenance essentials	Note
Exterior Maintenance	At least once a year	No dust, grease, etc.	Wipe clean with a cloth or with an air gun
Screw loose		No loosening screws for wiring boards, connectors, etc.	Get tighter

### 8.5.3 General standard for servo unit interior parts replacement

Mechanical wear and aging might occur for electrical and electronic components. To ensure safety, please perform periodic maintenance.

Also, please take the standard change year as the general standard and contact with the company or agency business. We will then investigate to determine whether replacing parts is needed or not. Since the parameters have been restored to the factory default, please reset to the user parameters before use.

Names of Parts	Standard change year	Using condition
Cooling Fan	4~5 years	<ul style="list-style-type: none"> <li>● Environment temperature:30℃ average</li> <li>● load factor: 80% or less</li> <li>● Run rate: 20 hours or less/ day</li> </ul>
Smoothing capacitor	7~8 years	
Relays	Based on actual needs	
Fuse	10 years	
Aluminum electrolytic capacitors printed circuit board	5 years	

## Chapter 9 Function Parameters

### Parameter definition

Pr1.XXgroup1: basic parameter

Pr2.XXgroup2: position control parameter

Pr3.XXgroup3: speed control parameter

Pr4.XXgroup4: torque control parameter

Pr5.XXgroup5: tuning parameter

Pr6.XXgroup6: input/output setting parameter

Pr7.XXgroup7: auxiliary function parameter

Pr8.XXgroup8: communication parameter

Pr9.XXgroup9: internal multi step position control parameter

PrA.XXgroupA: internal multi step speed control parameter

PrE.XXgroupE: motor parameter

Parameter properties

(○): Set at any time, effective immediately

(●): Set at any time, effective when re-start

(□): Stop setting, effective immediately

(■): Stop setting, effective when re-start

### Control mode specification

P—position control

S—speed control

T—torque control

### Pr1.XX: basic parameter

No.	Parameter specification	Factory default	Setting range	Fe atu re	Runni ng mode	Commu nication address
Pr1.00	Control mode selection	1	0: speed control mode 1: position control mode 2: torque control mode 3: speed/position control mode 4: speed/torque control mode 5: position/torque control mode	□	P S T	0x0100
Pr1.01	Internal SON instruction setting	0	0: internal Son invalid 1: internal enable servo (power down without saving, press the combination key (▲ + ▼) to stop	○	P S T	0x0101
Pr1.02	Rotary direction selection	0	0: CCW direction is forward direction 1: CW direction is forward	■	P S T	0x0102

Pr1.03	The initial drive status monitor display settings	0	0~28	○	P S T	0x0103
Pr1.04	Servo Off or overtravel stop mode	1	0: Servo OFF, free stop; overtravel, zero-speed stop. 1: Servo OFF Deceleration stop (deceleration time Pr1.05 setting) Overtravel, deceleration stop (deceleration time Pr1.06 setting)	□	P S T	0x0104
Pr1.05	Servo Off deceleration time	500	2~10000ms	□	P S T	0x0105
Pr1.06	Overtravel deceleration time	200	2~10000ms	□	P S T	0x0106
Pr1.08	Electromagnetic brake signal on delay time	0	0~10000ms	○	P S T	0x0108
Pr1.09	Electromagnetic brake signal off delay time	0	0~10000ms	○	P S T	0x0109
Pr1.10	External input pulses instruction clear	0	0: No action 1: Clear 19.CP and 20.CPv values, automatically cleared after setting to 1	○	P	0x010A

**Pr2.XX position control parameter**

No.	Parameter specification	Factory default	Setting range	Feature	Running mode	Communication address
Pr2.00	Position control mode command source selection	0	0: External pulse command (Pt) 1: Internal multi-instruction (Pr)	□	P	0x0200
Pr2.01	External pulse command input form selection	0	0: pulse (P) + a direction (N) positive logic 1: pulse (P) + directions (N) negative logic 2: AB-phase quadrature pulse positive logic 3: AB-phase quadrature pulse negative logic 4: CW + CCW pulse positive logic 5: CW + CCW pulse negative logic	■	P	0x0201

Pr2.02	Internal position command execution multistage selection	0	0: Run from Pr1 to Pr16, cycling 1: Run from Pr1 to Pr16, not circulated 2: External X terminal switching 3: seeking long calibration control	<input type="checkbox"/>	P	0x0202
Pr2.03	Internal margin position handling (only valid when Pr2.02 = 0 or 1)	0	0: start again from paragraph 1 position 1: continue to run not finish position	<input type="checkbox"/>	P	0x0203
Pr2.04	Internal position S-type smooth command forward acceleration / deceleration time	100	2~10000ms	<input type="checkbox"/>	P	0x0204
Pr2.05	Internal position S-type smooth command Reverse acceleration / deceleration time	100	2~10000ms	<input type="checkbox"/>	P	0x0205
Pr2.06	Location S smooth curve smooth acceleration and deceleration time	10	0~1000ms	<input type="checkbox"/>	P	0x0206
Pr2.07	External pulse smoothing	0	0~6500ms	<input type="checkbox"/>	P	0x0207
Pr2.08	Electronic gear numerator 1	1	1~32767	<input type="radio"/>	P	0x0208
Pr2.09	Electronic gear numerator 2	1	1~32767	<input type="radio"/>	P	0x0209
Pr2.10	Electronic gear numerator 3	1	1~32767	<input type="radio"/>	P	0x020A
Pr2.11	Electronic gear numerator 4	1	1~32767	<input type="radio"/>	P	0x020B
Pr2.12	Electronic gear denominator	1	1~32767	<input type="radio"/>	P	0x020C
Pr2.13	Positioning complete signal amplitude close	20	1~65535Pulse	<input type="checkbox"/>	P	0x020D
Pr2.14	Positioning Completion Range	10	0~65535Pulse	<input type="checkbox"/>	P	0x020E
Pr2.15	Deviation clear action selection (External X terminal)	0	0: The CLK edge clear 1: The CLK low clearance 2: High Clear 3: CLR edge clear	<input type="checkbox"/>	P	0x020F
Pr2.16	Position deviation clear choice	1	0: Only clear the deviation at the time of failure 1: Clear deviation Fault / Servo Off 2: Do not clear the deviation	<input type="checkbox"/>	P	0x0210
Pr2.17	Position deviation follow warning value	65535	10~65535 Pulse	<input type="checkbox"/>	P	0x0211

Pr2.18	Position deviation value follow fault value	65535	1~65535 Pulse	□	P	0x02122
Pr2.19	Homing function enable control	0	0: Disable homing function; 1: to enable the homing function by X terminal ORGS signal; 2: After powering on homing function immediately; 3: Right now searching home point	○	P	0x0213
Pr2.20	Origin detector type and direction searching setting	0	0: Forward back to zero, and the deceleration point of origin switch; 1: Reverse back to zero, and the deceleration point of origin switch; 2: Forward back to zero, and the deceleration point for the motor encoder Z signal; 3: Reverse back to zero, and the deceleration point for the motor encoder Z signal; 4: Forward back to zero, and the deceleration point is the origin switch, the origin of the motor encoder Z signal; 5: Reverse back to zero, and the deceleration point is the origin switch, the origin of the motor encoder Z signal; 6: Positive zero return deceleration limit switch positive point of origin for the home switch 7: negative zero return deceleration point negative limit switch, home switch origin	□	P	0x0214
Pr2.21	The first high-speed zero return speed setting	100	0~2000rpm	□	P	0x0215
Pr2.22	The second low-speed zero return speed setting	10	0~500rpm	□	P	0x0216
Pr2.23	OPR deceleration time	1000	10~1000ms	□	P	0x0217
Pr2.24	Homing time setting	65535	1~65535ms	□	P	0x0218
Pr2.25	After homing operation is completed if the servo is enabled	0	0: unable 1: enable	□	P	0x0219

Pr2.26	Homing pulse compensation equivalent	1	1~500Pulse	○	P	0x021A
Pr2.29	Mixed control mode, speed or torque mode to position mode smoothing time	50	2~10000ms	○	P	0x021D
Pr2.30	Encoder divider output molecule	10000	1~Pr2.31	●	P S T	0x021E
Pr2.31	Encoder output divider denominator	10000	1~10000	●	P S T	0x021F
Pr2.32	Z signal output pulse width coefficient	0	0: ×1 1: ×2	○	P S T	0x0220
Pr2.33	Z signal output polarity selection	0	0: positive polarity 1: negative polarity	●	P S T	0x0221
Pr2.34	Encoder pulse divided output feedback direction selection	0	0: Forward mode (A ahead of B) 1: Reverse mode (A lags B)	●		0x0222
Pr2.35	Quadrature encoder input filter time	15	0~1000ns	○	P S T	0x0223
Pr2.36	Speed pulse input filter time	30	0~1000ns	○	P	0x0224
Pr2.41	Fixed length 1 (pulse)	0	0~100 million	□	P	0x0229
Pr2.42	Fixed length 1 (pulse)	1000	0~10000	□	P	0x022A
Pr2.43	Seeker acceleration time	200	2~3000ms	□	P	0x022B
Pr2.44	Seeker deceleration time	500	2~3000ms	□	P	0x022C
Pr2.45	Seeker peed	200	2~3000rpm	□	P	0x022D
Pr2.46	Slip compensation speed	1.00	0.0~100.00rpm (invalid when 0 compensation)	□	P	0x022E
Pr2.47	Slip compensation threshold length (pulse)	50	10~1000	□	P	0x022F
Pr2.48	Seeker limit length (pulse)	3	1~120 million	□	P	0x0230
Pr2.49	Seeker minimum length 1 (pulse)	0	0~100 million	○	P	0x0231
Pr2.50	Seeker minimum length 2 (pulse)	1000	0~10000	○	P	0x0232
Pr2.51	Seeker limit length 1 (pulse)	0	0~10000	□	P	0x0233



**Pr3.XX: speed control parameters:**

No.	Parameter specification	Factory default	Setting range	Fe atu re	Runni ng mode	Commu nication address
Pr3.00	Speed control mode command source selection	0	0: Internal digital setting / communications given 1: Analog reference 1 2: Analog reference 2 3: Internal speed command switch	<input type="checkbox"/>	S	0x0300
Pr3.01	Internal multispeed selection	0	0: Multi-speed automatic switching cycle 1: Multi-speed automatic switching, not circulated 2: Multi-speed external X terminal switching	<input type="checkbox"/>	S	0x0301
Pr3.02	Speed S-type smooth command acceleration time constant	100	2~10000ms	<input type="radio"/>	S	0x0302
Pr3.03	Speed S-type smooth command deceleration time constant	100	2~10000ms	<input type="radio"/>	S	0x0303
Pr3.04	Speed S-curve acceleration and deceleration curve smoothing constant	10	0~1000ms	<input type="radio"/>	S	0x0304
Pr3.05	Speed command deceleration smoothing constant (low-pass smoothing filter)	0	0~1000.0ms	<input type="checkbox"/>	S	0x0305
Pr3.06	The maximum analog input (10V) corresponds to the speed command	3000	0~10000rpm	<input type="checkbox"/>	S	0x0306
Pr3.07	Analog speed command zero fixed value	10	0~300rpm	<input type="checkbox"/>	S	0x0307
Pr3.08	Zero speed signal output value	10	0~100rpm	<input type="checkbox"/>	P S T	0x0308
Pr3.09	Rotation signal output value	10	0~1000rpm	<input type="checkbox"/>	P S T	0x0309
Pr3.10	Speed Close threshold	100	10~3000rpm	<input type="checkbox"/>	S	0x030A
Pr3.11	Speed reach threshold	20	1~3000rpm	<input type="checkbox"/>	S	0x030B
Pr3.12	Maximum motor speed setting	5000	0~9000rpm	<input type="checkbox"/>	P S T	0x030C

Pr3.13	Speed command direction selection	0	0: same as the default command direction 1: opposite with the default command direction	○	S	0x030D
Pr3.14	Speed detection filter coefficients	0	0~8	○	P S T	0x030E

**Pr4.XX: torque control parameters:**

No.	Parameter specification	Factory default	Setting range	Fe atu re	Runni ng mode	Commu nication address
Pr4.00	Torque control mode command source selection	0	0: internal digit given (Pr4.01) 1: analog value 1 given 2: analog value 2 given	□	T	0x0400
Pr4.01	Internal digital setpoint torque command	100.0	0~±300.0%	○	T	0x0401
Pr4.02	Speed limit value during torque control	1000	0~5000rpm	○	T	0x0402
Pr4.03	Torque command smoothing constant	0.0	0~1000.0ms	□	T	0x0403
Pr4.04	Maximum analog input (10V) corresponding torque command	100	0~300%	□	T	0x0404
Pr4.05	Torque limit selection when position control, speed control and torque control	0	0: internal limit [Pr5.27 ~ Pr5.28] 1: Analog 1 limit (At the same time limited by Pr5.27 / Pr5.28) 2: Analog 2 limit (At the same time limited by Pr5.27 / Pr5.28)	□	P S T	0x0405
Pr4.06	Torque command direction selection	0	0: same direction as the default 1: Contrary to the default direction	○	T	0x0406
Pr4.07	Torque control speed limit sources	0	0: Internal speed limit (Pr4.02) 1: External analog speed limit	□	T	0x0407
Pr4.08	External analog speed limit selection	0	0: analog value 1 given 1: analog value 2 given	□	T	0x0408

## Pr5.XX: gain parameters

No.	Parameter specification	Factory default	Setting range	Fe atu re	Runni ng mode	Commun ication address
Pr5.00	Position control regulator proportional gain 1	20.0	1.0~2000.0 Hz	○	P	0x0500
Pr5.01	The speed loop proportional gain 1	150.0	0.1~3000.0 Hz	○	P S	0x0501
Pr5.02	Speed loop integral time 1	25.0	0.1~3000.0 ms	○	P S	0x0502
Pr5.03	Position control regulator proportional gain 2	40.0	1.0~2000.0 Hz	○	P	0x0503
Pr5.04	The speed loop proportional gain 2	150.0	0.1~3000.0 Hz	○	P S	0x0504
Pr5.05	Speed loop integral time 2	20.0	0.1~3000.0 ms	○	P S	0x0505
Pr5.06	Position feed-forward gain control regulator	0.0	0.0~100.0 %	○	P	0x0506
Pr5.07	Position control feed-forward gain smoothing constant	5	2~100 ms	○	P	0x0507
Pr5.08	Two gain changing selection	0	0: Fixed to 1st gain 1: Fixed to 2nd gain 2: X terminal switching (G-SEL) 3: position pulse difference switching condition, switching threshold is Pr5.09 4: speed command is switching condition, switching threshold is Pr5.10 5: the torque command switching condition, switching threshold is Pr5.12	□	P S	0x0508
Pr5.09	Two gain changing selection - position pulse deviation	30	0~65535 Pulse	□	P	0x0509
Pr5.10	Two gain changing selection - speed command	100	0~65535 rpm	□	P S	0x050A
Pr5.12	Two gain changing selection - torque command	20.0	0~300.0 %	□	P S	0x050C
Pr5.13	Gain wait time 1	0	0~10000 ms	○	P S	0x050D
Pr5.14	Gain switching time 1	0	0~10000 ms	○	P S	0x050E
Pr5.15	Waiting time gain 2	0	0~10000 ms	○	P S	0x050F
Pr5.16	Gain switching time 2	0	0~10000 ms	○	P S	0x0510
Pr5.17	Velocity loop control mode	0	0: PI control 1: P-PI control switch	□	P S	0x0511

Pr5.18	P-PI control switching condition selection	1	0: External X terminal switch 1: Internal torque command 2: speed command 3: Pulse Deviation	□	P S	0x0512
Pr5.19	Internal torque command switching P-PI Conditions	30.0	0~300.0 %	□	P S	0x0513
Pr5.20	Speed command switching P-PI Conditions	0	0~9000 rpm	□	P S	0x0514
Pr5.22	Position deviation pulse switching P-PI Conditions	0	0~65535 Pulse	□	P	0x0516
Pr5.25	Forward emergency braking torque limit	100%	0.0%~300.0%	□	P S T	0x0519
Pr5.26	Reverse emergency braking torque limit	100%	0.0%~300.0%	□	P S T	0x051A
Pr5.27	Drive maximum torque limit	300%	0.0%~300.0%	□	P S T	0x051B
Pr5.28	Drive maximum reverse torque limit	300%	0.0%~300.0%	□	P S T	0x051C
Pr5.29	Load inertia / motor inertia	1.00	0.01~100.00	□	P S T	0x051D
Pr5.31	Mechanical resonance frequency detection switch	0	0: Close 1: Open (not save)	○	P S	0x051F
Pr5.32	The first mechanical resonance frequency	-	50 ~ 2000 Hz (read only)	-	P S	0x0520
Pr5.33	The 2 mechanical resonance frequency	-	50 ~ 2000 Hz (read only)	-	P S	0x0521
Pr5.34	Group 1 notch frequency	2000	50 ~ 2000 Hz (2000 closed) 2000 Close	○	P S	0x0522
Pr5.35	Group 1 notch width rating	2	0-20	○	P S	0x0523
Pr5.36	Group 1 trap depth rating	2	0~99	○	P S	0x0524
Pr5.37	Group 2 notch filter frequency	2000	50 ~ 2000 Hz (2000 closed) 2000 Close	○	P S	0x0525
Pr5.38	Group 2 notch width rating	2	0-20	○	P S	0x0526
Pr5.39	Group 2 notch depth rating	2	0~99	○	P S	0x0527

**Pr6.XX: input/output parameters**

No.	Parameter specification	Factory default	Setting range	Fe ature	Runni ng mode	Comm unication address
Pr6.00	X terminal input filter response time setting	2	0~20ms	○	P S T	0x0600
Pr6.01	X terminal level logic	11111111	00000000~11111111 0: low level valid 1: high level valid	○	P S T	0x0601
Pr6.02	X1 functional planning	1	0~99	○	P S T	0x0602

Pr6.03	X2 functional planning	2	0~99	○	P S T	0x0603
Pr6.04	X3 functional planning	3	0~99	○	P S T	0x0604
Pr6.05	X4 functional planning	4	0~99	○	P S T	0x0605
Pr6.06	X5 functional planning	5	0~99	○	P S T	0x0606
Pr6.07	X6 functional planning	6	0~99	○	P S T	0x0607
Pr6.08	X7 functional planning	7	0~99	○	P S T	0x0608
Pr6.09	X8 functional planning	8	0~99	○	P S T	0x0609
Pr6.10	X9 functional planning	9	0~99	○	P S T	0x060A
Pr6.12	AI1 sampling detuning	0	-1~1.000V	○	P S T	0x060C
Pr6.13	AI2 sampling detuning	0	-1~1.000V	○	P S T	0x060D
Pr6.15	AI1 zero deadband setting	0.5	0.0~100.0%	○	P S T	0x060F
Pr6.16	AI2 zero deadband setting	0.5	0.0~100.0%	○	P S T	0x0610
Pr6.18	AI1 Analog input filter time	2	0~10000ms	○	P S T	0x0612
Pr6.19	AI2 Analog input filter time	2	0~10000ms	○	P S T	0x0613
Pr6.21	Y terminal level logic	111111	000000~111111 0: low level valid 1: high level valid	○	P S T	0x0615
Pr6.22	Y1 functional planning	1	0~99	○	P S T	0x0616
Pr6.23	Y2 functional planning	2	0~99	○	P S T	0x0617
Pr6.24	Y3 functional planning	3	0~99	○	P S T	0x0618
Pr6.25	Y4 functional planning	4	0~99	○	P S T	0x0619
Pr6.26	Y5 functional planning	5	0~99	○	P S T	0x061A
Pr6.27	Y6 functional planning	12	0~99	○	P S T	0x061B
Pr6.28	Y1 valid delay time	0	0~10000ms	○	P S T	0x061C
Pr6.29	Y1 invalid delay time	0	0~10000ms	○	P S T	0x061D
Pr6.30	Y2 valid delay time	0	0~10000ms	○	P S T	0x061E
Pr6.31	Y2 invalid delay time	0	0~10000ms	○	P S T	0x061F
Pr6.32	Y3 valid delay time	0	0~10000ms	○	P S T	0x0620
Pr6.33	Y3 invalid delay time	0	0~10000ms	○	P S T	0x0621
Pr6.38	Zero offset from the analog input adjustment	0	0: Close offset automatic adjustment 1: Enable AI1 offset automatic adjustment 2: Enable AI2 offset automatic adjustment	□	P S T	0x0626
Pr6.39	Forced digital output	000000	000000~111111	□	P S T	0x0627
Pr6.40	Internal or external X terminal switching	0	0: external X terminal 1: internal X terminal	□	P S T	0x0628

Pr6.41	Internal X terminal high/low setting	000000000	000000000~111111111	○	P S T	0x0629
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**X terminal function:**

Setting value	Name	Function	specification	Trigger mode	Running mode
0	Disable	Function invalid			
1	SON	Servo enable	OFF: servo motor enable forbidden ON: servo motor power on enable	Level triggered	P S T
2	ALRS	Alarm reset	For troubleshooting, you can reset the fault reset	Edge triggered	P S T
3	PCLR	Position control pulse deviation counter clear	See trigger mode in Pr2.15	Level/Edge triggered	P
4	SPDINV	Speed command direction selection	OFF: same direction as the default ON: Contrary to the default direction	Level triggered	S
5	CMD1	Internal instruction bit0	Position control mode:the signal is the location multistage selection function; Speed control mode: the signal is the multi-speed signal selection function	Level triggered	P S
6	CMD2	Internal instructionbit1		Level triggered	P S
7	CMD3	Internal instructionbit2		Level triggered	P S
8	CMD4	Internal instructionbit3		Level triggered	P S
9	PCTRG	Internal position command trigger (Pr2.02 = 2 valid)	Multi-position trigger conditions (when used with an external X Multi-position switch internal instruction)	Edge triggered	P
10	MSEL	Control mode switching	Mixed control mode switching	Level triggered	P S T
11	ZCLAMP	Analog speed command zero fixed enable signal	ON: Zero fixed function enable OFF: Zero bit fixed function disable	Level triggered	S
12	INH	Pulse forbidden	ON: no command pulse input OFF: Allow command pulse input	Level triggered	P
13	P-OT	Forward driving forbidden	When the mechanical movement exceeds the movable range into overtravel prevention function: ON: Forward driving ban OFF: Allow forward drive	Level triggered	P S T
14	N-OT	Reverse driving forbidden	When the mechanical movement exceeds the movable range into overtravel prevention function: ON: reverse driving ban OFF: Allow reverse drive	Level triggered	P S T

15	Reserved						
16	Reserved						
17	JOGCMD+	Forward jog	ON: in accordance with the instructions given rotation OFF: Run command Stop input		Level triggered	S	
18	JOGCMD-	Reverse jog	ON: in accordance with the instructions given rotation OFF: Run command Stop input		Level triggered	S	
19	GEAR1	Electronic gear numerator option 1	GEAR2	GEAR1	electronic gear numerator	Level triggered	P
			0	0	Pr2.08		
20	GEAR2	Electronic gear numerator option 2	0	1	Pr2.09	Level triggered	P
			1	0	Pr2.10		
			1	1	Pr2.11		
21	GainSel	Two gain switching	OFF: 1st gain ON: 2nd gain		Level triggered	P S	
22	PCNT	P / PI control switching	ON: P control for the speed control loop OFF: PI control for the speed control loop		Level triggered	P S	
23	ORGP	Origin switch signal	OFF: do not touch the origin switch ON: Touch the origin switch		Level triggered	P S T	
24	ORGS	Origin homing start signal	OFF: Prohibition homing function ON: Enable homing function		Edge triggered	P S T	
25	TRQINV	Reverse torque command	OFF: same as the default torque command direction ON: opposite with the default torque command direction		Level triggered	T	
26	INPOSEN	Internal position command trigger (Pr2.02 = 0 or 1 valid)	Multistage position trigger condition		Level triggered	P	
29	MARKEN	Color trigger function (Pr2.02 = 3 valid)	Trigger seeking long calibration function		Edge triggered	P	
30	EMEBAK	External emergency brake	OFF: External emergency braking invalid ON: Emergency internal brake valid		Level triggered	P S T	
27-99	Reserved						

**Y terminal function:**

Setting value	Name	function	specification	Running mode
0	Disable			
1	SRDY	Servo ready	Servo status ready to receive S-ON signal: Valid:servo ready Invalid:servo not ready	P S T
2	BRKR	Electromagnetic brake output	Electromagnetic brake signal output: Valid: lifting electromagnetic brake Invalid: enable electromagnetic brake	P S T
3	TGON	Motor rotation output	Output signal when the servo motor rotates: Valid: motor rotation signal valid Invalid: motor rotation signal invalid	P S T
4	ZS	Zero speed signal	Signal outputed when the servo motor stops: Valid: the motor speed is zero Invalid: motor speed is not zero	P S T
5	V_Near	Speeds approaching	Speed control: valid when the absolute value of the difference between the servo motor speed and the speed command is less than the set speed deviation value Pr3.10	S
6	V_CMP	Speed arrival	Speed control mode: valid when the absolute value of the difference between the servo motor speed and the speed command is less than the set speed deviation value Pr3.11	S
7	P_Near	Position approaching	Position control mode: valid when the position deviation pulse arrives within close positioning and complete signal amplitude Pr2.13 setpoint	P
8	P_CMP	Position arrival	Position control mode: valid when the position deviation pulse arrives within close positioning and complete signal amplitude Pr2.14 setpoint	P
9	T_Limt	Torque limit signal	Torque limit confirmation signal: Valid: motor torque limited Invalid: motor torque not limited	P S T
10	V_Limt	Speed limit signal	Torque control:confirmation signal of speed limit: Valid: motor torque limited Invalid: motor torque not limited	T
11	WAR	Alarm output signal	State signal valid when detecting a warning	P S T
12	ALM	Fault output signal	State signal valid when detecting a fault	P S T
13	ORGC	Homing complete signal	Invalid: unable homing function or homing function after use, return to the origin of the failure; valid: enable homing function, return to the origin success	P S T
14	INTF	Length determining completed	Invalid: set length not completed Valid: set length completed	P



15	PCMD_OK	Instruction completed	The internal position control mode, valid when each location is sent	P
16	PMC_OK	Movement completed	The internal position control mode, valid when each location is sent and the location is completed	P
17	INTFFAIL	Length determining completed	Invalid: The break length does not reach the limit Valid: The break length reaches seeker determined limit	P

**Pr7.XX: Auxiliary function parameters**

No.	Parameter specification	Factory default	Setting range	Feature	Running mode	Communication address
Pr7.00	Jog function	JOGE <sub>n</sub>	-	○	P S T	0x0700
Pr7.01	Jog speed setting	100	0~3000rpm	○	P S T	0x0701
Pr7.02	Drive overload alert settings	80	20~100%	○	P S T	0x0702
Pr7.03	Motor overload warning settings	80	20~100%	○	P S T	0x0703
Pr7.04	Drive overtemperature warning point	85	40~Pr7.05℃	■	P S T	0x0704
Pr7.05	Drive overtemperature fault point	90	Pr7.04~100℃	■	P S T	0x0705
Pr7.06	Fan control	1	0: Servo operation is related with temperature when fan is on(when module temperature exceeds 45℃ the fan is running, when less than 40℃ the fan stops); Servo OFF, the fan stops. 1: when servo ON the fan is running; when servo OFF the fan operation is related with temperature (when module temperature exceeds 45℃ the fan is running, when less than 40℃ the fan stops) 2: the fan runs when power on	○	P S T	0x0706
Pr7.07	Fault display selection	0	0: check the last fault 1: check the last 2ed fault 2: check the last 3rd fault 3: check the last 4 <sup>th</sup> fault	○	P S T	0x0707

Pr7.08	System parameters initialization	0	0: no operation 1: clear fault record 2: restore factory default	■	P S T	0x0708
Pr7.09	Software reset	0	0: no operation 1: system software reset	□	P S T	0x0709
Pr7.10	Fault reset	0	0: no operation 1: fault reset, implement	□	P S T	0x070A
Pr7.11	Factory password 1, the retention parameters visible to the user, cleared after power	0	0~65535	□	P S T	0x070B
Pr7.12	Factory password 2, the retention parameters visible to the user, cleared after power	0	0~65535	□	P S T	0x070C
Pr7.19	Master power detection selection	0	0: no power source detection 1: start power source detection	○	P S T	0x0713

**Pr8.XX: communication parameters:**

No.	Parameter specification	Factory default	Setting range	Feature	Running mode	Communication address
Pr8.00	485 Station number setting	1	1~254	○	P S T	0x0800
Pr8.01	Modbus communication mode selection	0	0: RTU mode 1: ASCII mode	○	P S T	0x0801
Pr8.02	485 transmission rate	2	0: 4800 bps 1: 9600 bps 2: 19200 bps 3: 38400 bps 4: 57600 bps 5: 115200 bps	○	P S T	0x0802
Pr8.03	Communication data format	0	0: 8 data bits, no parity, 1 stop bit 1: 8 data bits, odd parity, 1 stop bit 2: 8 data bits, even parity, 1 stop bit 3: 8 data bits, no parity, 2 stop bits 4: 8 data bits, odd parity, 2 stop bits 5: 8 data bits, even parity, 2 stop bits	○	P S T	0x0803
Pr8.04	Communication disconnection action mode	0	0: Warning and maintain operation	○	P S T	0x0804

			1: Report fault and stop running			
Pr8.05	Communication timeout	0	0~20S (Communication timeout is disabled when 0)	○	P S T	0x0805
Pr8.10	CAN communication station number setting	1	1~254	●	P S T	0x080A
Pr8.11	CAN communication transmission rate	2	0: 20K 1: 50K 2: 100K 3: 125K 4: 250K 5: 500K 6: 1000K(1M)	●	P S T	0x080B

**Pr9.XX: internal multi-position**

No.	Parameter specification	Factory default	Setting range	Feature	Running mode	Communication address
Pr9.00	Cycles of internal position command 1	0	0~±30000 rev	○	P	0x0900
Pr9.01	Pulse of internal position command 1	0	0~±9999 Puls	○	P	0x0901
Pr9.02	Moving speed of internal position command 1	1000	1~3000 rpm	○	P	0x0902
Pr9.03	Waiting time after completing the 1 <sup>st</sup> position	1.0	0.0~3000.0 S	○	P	0x0903
Pr9.04	Cycles of internal position command 2	0	0~±30000 rev	○	P	0x0904
Pr9.05	Pulse of internal position command 2	0	0~±9999 Puls	○	P	0x0905
Pr9.06	Moving speed of internal position command 2	1000	1~3000 rpm	○	P	0x0906
Pr9.07	Waiting time after completing the 2 <sup>ed</sup> position	1.0	0.0~3000.0 S	○	P	0x0907
Pr9.08	Cycles of internal position command 3	0	0~±30000 rev	○	P	0x0908
Pr9.09	Pulse of internal position command 3	0	0~±9999 Puls	○	P	0x0909
Pr9.10	Moving speed of internal position command 3	1000	1~3000 rpm	○	P	0x090A
Pr9.11	Waiting time after completing the 3 <sup>rd</sup> position	1.0	0.0~3000.0 S	○	P	0x090B
Pr9.12	Cycles of internal position command 4	0	0~±30000 rev	○	P	0x090C

Pr9.13	Pulse of internal position command 4	0	0~±9999 Puls	○	P	0x090D
Pr9.14	Moving speed of internal position command 4	1000	1~3000 rpm	○	P	0x090E
Pr9.15	Waiting time after completing the 4th position	1.0	0.0~3000.0 S	○	P	0x090F
Pr9.16	Cycles of internal position command 5	0	0~±30000 rev	○	P	0x0910
Pr9.17	Pulse of internal position command 5	0	0~±9999 Puls	○	P	0x0911
Pr9.18	Moving speed of internal position command 5	1000	1~3000 rpm	○	P	0x0912
Pr9.19	Waiting time after completing the 5th position	1.0	0.0~3000.0 S	○	P	0x0913
Pr9.20	Cycles of internal position command 6	0	0~±30000 rev	○	P	0x0914
Pr9.21	Pulse of internal position command 6	0	0~±9999 Puls	○	P	0x0915
Pr9.22	Moving speed of internal position command 6	1000	1~3000 rpm	○	P	0x0916
Pr9.23	Waiting time after completing the 6th position	1.0	0.0~3000.0 S	○	P	0x0917
Pr9.24	Cycles of internal position command 7	0	0~±30000 rev	○	P	0x0918
Pr9.25	Pulse of internal position command 7	0	0~±9999 Puls	○	P	0x0919
Pr9.26	Moving speed of internal position command 7	1000	1~3000 rpm	○	P	0x091A
Pr9.27	Waiting time after completing the 7th position	1.0	0.0~3000.0 S	○	P	0x091B
Pr9.28	Cycles of internal position command 8	0	0~±30000 rev	○	P	0x091C
Pr9.29	Pulse of internal position command 8	0	0~±9999 Puls	○	P	0x091D
Pr9.30	Moving speed of internal position command 8	1000	1~3000 rpm	○	P	0x091E
Pr9.31	Waiting time after completing the 8th position	1.0	0.0~3000.0 S	○	P	0x091F
Pr9.32	Cycles of internal position command 9	0	0~±30000 rev	○	P	0x0920
Pr9.33	Pulse of internal position command 9	0	0~±9999 Puls	○	P	0x0921
Pr9.34	Moving speed of internal position command 9	1000	1~3000 rpm	○	P	0x0922

Pr9.35	Waiting time after completing the 9th position	1.0	0.0~3000.0 S	○	P	0x0923
Pr9.36	Cycles of internal position command 10	0	0~±30000 rev	○	P	0x0924
Pr9.37	Pulse of internal position command 10	0	0~±9999 Puls	○	P	0x0925
Pr9.38	Moving speed of internal position command 10	1000	1~3000 rpm	○	P	0x0926
Pr9.39	Waiting time after completing the 10th position	1.0	0.0~3000.0 S	○	P	0x0927
Pr9.40	Cycles of internal position command 11	0	0~±30000 rev	○	P	0x0928
Pr9.41	Pulse of internal position command 11	0	0~±9999 Puls	○	P	0x0929
Pr9.42	Moving speed of internal position command 11	1000	1~3000 rpm	○	P	0x092A
Pr9.43	Waiting time after completing the 11th position	1.0	0.0~3000.0 S	○	P	0x092B
Pr9.44	Cycles of internal position command 12	0	0~±30000 rev	○	P	0x092C
Pr9.45	Pulse of internal position command 12	0	0~±9999 Puls	○	P	0x092D
Pr9.46	Moving speed of internal position command 12	1000	1~3000 rpm	○	P	0x092E
Pr9.47	Waiting time after completing the 12th position	1.0	0.0~3000.0 S	○	P	0x092F
Pr9.48	Cycles of internal position command 13	0	0~±30000 rev	○	P	0x0930
Pr9.49	Pulse of internal position command 13	0	0~±9999 Puls	○	P	0x0931
Pr9.50	Moving speed of internal position command 13	1000	1~3000 rpm	○	P	0x0932
Pr9.51	Waiting time after completing the 13th position	1.0	0.0~3000.0 S	○	P	0x0933
Pr9.52	Cycles of internal position command 14	0	0~±30000 rev	○	P	0x0934
Pr9.53	Pulse of internal position command 14	0	0~±9999 Puls	○	P	0x0935
Pr9.54	Moving speed of internal position command 14	1000	1~3000 rpm	○	P	0x0936
Pr9.55	Waiting time after completing the 14th position	1.0	0.0~3000.0 S	○	P	0x0937
Pr9.56	Cycles of internal position command 15	0	0~±30000 rev	○	P	0x0938

Pr9.57	Pulse of internal position command 15	0	0~±9999 Puls	○	P	0x0939
Pr9.58	Moving speed of internal position command 15	1000	1~3000 rpm	○	P	0x093A
Pr9.59	Waiting time after completing the 15th position	1.0	0.0~3000.0 S	○	P	0x093B
Pr9.60	Cycles of internal position command 16	0	0~±30000 rev	○	P	0x093C
Pr9.61	Pulse of internal position command 16	0	0~±9999 Puls	○	P	0x093D
Pr9.62	Moving speed of internal position command 16	1000	1~3000 rpm	○	P	0x093E
Pr9.63	Waiting time after completing the 16th position	1.0	0.0~3000.0 S	○	P	0x093F

**PrA.XX: Internal multi-speed control parameters**

No.	Parameter specification	Factory default	Setting range	Fe atu	Running mode	Communication
PrA.00	Internal speed command register 1	400	0~±5000 rpm	○	S	0x0A00
PrA.01	1 <sup>st</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A01
PrA.02	Internal speed command register 2	0	0~±5000 rpm	○	S	0x0A02
PrA.03	2 <sup>ed</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A03
PrA.04	Internal speed command register 3	-400	0~±5000 rpm	○	S	0x0A04
PrA.05	3 <sup>rd</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A05
PrA.06	Internal speed command register 4	0	0~±5000 rpm	○	S	0x0A06
PrA.07	4 <sup>th</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A07
PrA.08	Internal speed command register 5	800	0~±5000 rpm	○	S	0x0A08
PrA.09	5 <sup>th</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A09
PrA.10	Internal speed command register 6	0	0~±5000 rpm	○	S	0x0A0A
PrA.11	6 <sup>th</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A0B
PrA.12	Internal speed command register 7	-800	0~±5000 rpm	○	S	0x0A0C

PrA.13	7 <sup>th</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A0D
PrA.14	Internal speed command register 8	0	0~±5000 rpm	○	S	0x0A0E
PrA.15	8 <sup>th</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A0F
PrA.16	Internal speed command register 9	1200	0~±5000 rpm	○	S	0x0A10
PrA.17	9 <sup>th</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A11
PrA.18	Internal speed command register 10	0	0~±5000 rpm	○	S	0x0A12
PrA.19	10 <sup>th</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A13
PrA.20	Internal speed command register 11	-1200	0~±5000 rpm	○	S	0x0A14
PrA.21	11 <sup>th</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A15
PrA.22	Internal speed command register 12	0	0~±5000 rpm	○	S	0x0A16
PrA.23	12 <sup>th</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A17
PrA.24	Internal speed command register 13	1600	0~±5000 rpm	○	S	0x0A18
PrA.25	13 <sup>th</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A19
PrA.26	Internal speed command register 14	0	0~±5000 rpm	○	S	0x0A1A
PrA.27	14 <sup>th</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A1B
PrA.28	Internal speed command register 15	-1600	0~±5000 rpm	○	S	0x0A1C
PrA.29	15 <sup>th</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A1D
PrA.30	Internal speed command register 16	0	0~±5000 rpm	○	S	0x0A1E
PrA.31	16 <sup>th</sup> speed instruction running time	1.0	0.1~6535.5 S	□	S	0x0A1F

## PrE.XX: motor parameters

No.	Parameter specification	Factory default	Setting range	Fe atu	Running mode	Communi cation
PrE.00	Hardware version	##	Model determined	-	P S T	0x0E00
PrE.01	DSP version number	####	Model determined	-	P S T	0x0E01
PrE.02	FPGA version number	##	Model determined	-	P S T	0x0E02
PrE.03	Drive power rating	##	Model determined	-	P S T	0x0E03
PrE.04	Current motor model	###	Model determined	-	P S T	0x0E04
PrE.05	Motor parameter password	#####	0~65535	■	P S T	0x0E05
The following sections can only be modified and checked by inputting correct password in PrE.05						
PrE.06	Motor model selection	####	Model determined	■	P S T	0x0E06
PrE.07	Motor rated power (W)	##.##	Model determined	■	P S T	0x0E07
PrE.08	Motor rated voltage (V)	###	Model determined	■	P S T	0x0E08
PrE.09	Motor rated current (A)	##.##	Model determined	■	P S T	0x0E09
PrE.10	Motor maximum current (A)	##.##	Model determined	■	P S T	0x0E0A
PrE.11	Motor rated torque (N · m)	###.##	Model determined	■	P S T	0x0E0B
PrE.12	maximum motor torque (rpm)	###.##	Model determined	■	P S T	0x0E0C
PrE.13	Motor rated speed (N · m)	####	Model determined	■	P S T	0x0E0D
PrE.14	Motor maximum speed (N · m)	####	Model determined	■	P S T	0x0E0E
PrE.15	Number of pole pairs (pair)	###	Model determined	■	P S T	0x0E0F
PrE.16	Stator inductance Lq (mH)	###.##	Model determined	■	P S T	0x0E10
PrE.17	Stator inductance Ld (mH)	###.##	Model determined	■	P S T	0x0E11
PrE.18	Line - line resistance (Ω)	####	Model determined	■	P S T	0x0E12
PrE.19	Counter electromotive force constant (V)	##.##	Model determined	■	P S T	0x0E13
PrE.20	Electrical time constant	##.##	Model determined	■	P S T	0x0E14
PrE.21	Mechanical time constant	##.##	Model determined	■	P S T	0x0E15
PrE.22	Torque constant (N · m / A)	##.##	Model determined	■	P S T	0x0E16
PrE.23	Rotor moment of inertia (kg · cm <sup>2</sup> )	###.##	Model determined	■	P S T	0x0E17
PrE.24	Current loop proportional gain	#	Model determined	■	P S T	0x0E18
PrE.25	Encoder selection: 0: non wireless incremental encoder 1: wireless encoder	#	Model determined	■	P S T	0x0E19
PrE.26	Encoder lines (not 4-fold ago)	####	Model determined	■	P S T	0x0E1A



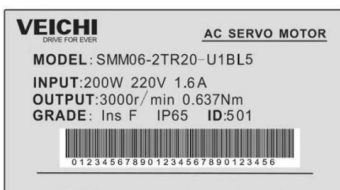
PrE.27	Reserved					0x0E1B
PrE.28	Zero signal offset angle (°)	##	Model determined	■	P S T	0x0E1C
PrE.29	Encoder UVW shift angle (°)	##	Model determined	■	P S T	0x0E1D
PrE.30	Current loop integral gain	#	Model determined	■	P S T	0x0E1E

**Appendix 1--- function code PrE.04 corresponding list (220V)**

Motor	Model	Note
500	SMM06-2TR10-U1NL5	0.1Kw non wireless encoder 60 flange
501	SMM06-2TR20-U1NL5	0.2Kw non wireless encoder 60 flange
502	SMM06-2TR40-U1NL5	0.4Kw non wireless encoder60 flange
503	SMM06-2TR60-U1NL5	0.6Kw non wireless encoder 60 flange
504	SMM08-2TR75-U1NL5	0.75Kw non wireless encoder 80 flange
505	SMM08-2T1R0-U1NL5	1.0Kw non wireless encoder 80 flange
753	SMM11-2T1R2-U1NH	1.2Kw non wireless encoder 110 flange
754	SMM11-2S1R2-U1NH	1.2Kw non wireless encoder 110 flange
755	SMM11-2T1R5-U1NH	1.5Kw non wireless encoder 110 flange
756	SMM11-2T1R8-U1NH	1.8Kw non wireless encoder 110 flange
506	SMM13-2U1R0-U1NH5	1.0Kw non wireless encoder 130 flange
507	SMM13-2U1R3-U1NH5	1.3Kw non wireless encoder 130 flange
508	SMM13-2U1R5-U1NH5	1.5Kw non wireless encoder 130 flange
509	SMM13-2U2R0-U1NH5	2.0Kw non wireless encoder 130 flange
600	SMM13-2L1R0-U1NH5	1.0Kw non wireless encoder 130 flange
601	SMM13-2Y1R5-U1NH5	1.5Kw non wireless encoder 130 flange
602	SMM13-2U2R6-U1NH5	2.6Kw non wireless encoder 130 flange
603	SMM13-2Y2R3-U1NH5	2.3Kw non wireless encoder 130 flange
604	SMM13-2U3R8-U1NH5	3.8Kw non wireless encoder 130 flange

**Appendix 3---servomotor nameplate (see ID:501)**

Motor code(PrE.04)	Model	Note
605	SMM18-3Y2R9-U1NH5	2.9Kw non wireless encoder 180 flange
606	SMM18-3Y4R4-U1NH5	4.4Kw non wireless encoder 180 flange
607	SMM18-3Y5R5-U1NH5	5.5Kw non wireless encoder 180 flange
608	SMM18-3Y7R5-U1NH5	7.5Kw non wireless encoder 180 flange



Note: The ID number on motor nameplate corresponds to the PrE.04 value in drive function code, please make sure that the ID number is the same as PrE.04 set value, and if they are not the same, please contact the dealer or manufacturer. Incorrect PrE.04 setting may lead to machine malfunction.

## Warranty Card

**Profile**

User Name : \_\_\_\_\_

Address : \_\_\_\_\_

Contacts : \_\_\_\_\_ Phone : \_\_\_\_\_ Fax : \_\_\_\_\_

Model : \_\_\_\_\_ Machine Code : \_\_\_\_\_

**Agent/Distributor Profile**

Delivery Company : \_\_\_\_\_

Contacts : \_\_\_\_\_ Phone : \_\_\_\_\_ Delivery Date : \_\_\_\_\_

## Warranty Clauses

The Company solemnly states that since the day users purchase from my company (hereinafter referred to as manufacturer),they can enjoy the following warranty services;

- 1.Since the date of purchase, users can enjoy the following warranty services of the product:
  - 1) Within 30 days after shipment,the company promises returning,replacement and maintenance of the product.
  - 2) Within 90 days after shipment,the company promises replacement and maintenance of the product.
  - 3) Within 18 months after shipment,the company promises only maintenance of the product.
  - 4) Products exported to countries except China shall not enjoy the warranties mentioned above.
2. Since the date of purchase, users can enjoy the service of the company when they pay for the service.
3. Exception Clauses: Product failures caused by the following reasons would not enjoy the free warranty services of the manufacturer:
  - 1) Failures caused by operations of users that is not operated in accordance with the requirements of the product manual;
  - 2) Failures caused when users repair or renovate the product without communicating with the manufacturer in advance;
  - 3) Failures caused by abnormal aging of the product resulted from poor using environment;
  - 4) Failures caused by earthquake, fire or other natural disasters or abnormal voltage;
  - 5) Failures caused by damage during transportation(mode of transportation is decided by users and the company only helps to handle cargo shipment procedures).
4. In the following conditions, the manufacturer have the right not to provide warranty services:
  - 1) When the marks,trademarks or nameplates of the products are destroyed or can not be identified;
  - 2) When users do not pay for the product according to signed contract;
  - 3) When users intentionally hiding the improper operations during installation, wiring and maintenance;
5. For products that enjoy all returning,replacement and maintenance services, first the product should be returned to the company and after responsibility confirmation,the product can be replaced or repaired.

## Certificate of Approval

QC check : \_\_\_\_\_



The product has been checked and proved to be qualified for delivery in conformity with standard.