S6 Series
High-Performance Spindle Servo Drive
User Manual

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Chapter 1 Servo System Specifications

1.1 Servo drive

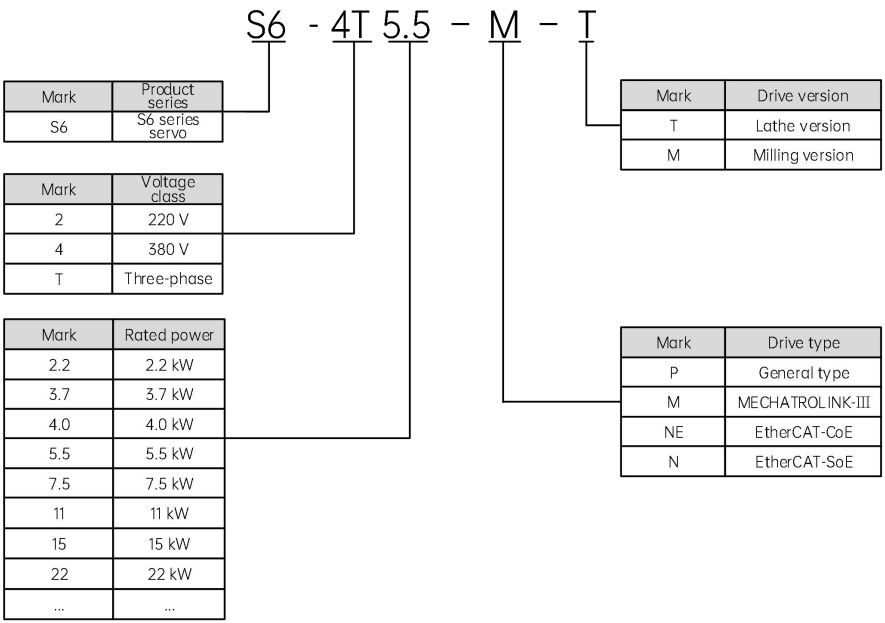


Fig. 1-1 S6 servo drive model description

Note:

T: The lathe version supports incremental encoder, SinCos encoder, double incremental encoder, absolute value + SinCos encoder; the maximum speed of the lathe version supports 12000RPM.

M: The milling version supports incremental encoders, SinCos encoder, and BISS-C encoder; the maximum speed of the milling version supports 60000 rpm.

The description of the servo drive model on the nameplate indicates the information of the product, such as product series, voltage class of power supply, power class, etc.

1.2 Product nameplate

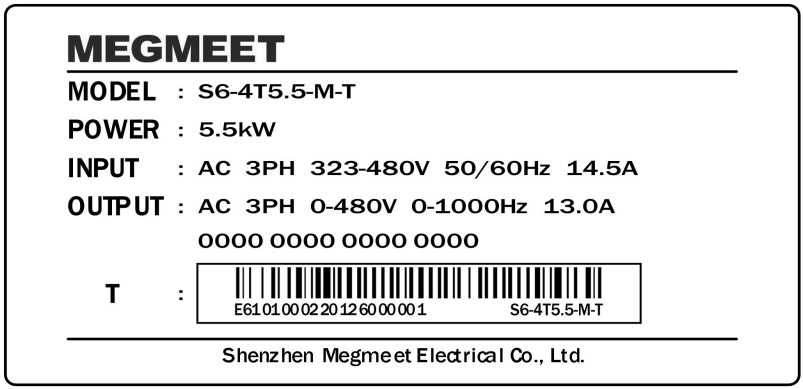


Fig. 1-2 Product nameplate description

1.3 Product series

Product model	Rated input voltage (V)	Input voltage phase	Drive rated power (kW)	Applicative motor power (kW)	Rated input current (A)	Rated output current (A)	Max. output current (A)	Drive SIZE
S6-4T2.2-*-*	380	3	2.2	2.2	5.8	5.5	11	SIZE B
S6-4T3.7-*-*	380	3	3.7	3.7	10.5	8.8	17.6	SIZE B
S6-4T4.0-*-*	380	3	4.0	3.7	11	9.0	18	SIZE C
S6-4T5.5-*-*	380	3	5.5	5.5	14.5	13.0	26	SIZE C
S6-4T7.5-*-*	380	3	7.5	7.5	20.5	17.0	34	SIZE C
S6-4T11-*-*	380	3	11	11	26	25.0	50	SIZE C
S6-4T15-*-*	380	3	15	15	35	32.0	64	SIZE D
S6-4T22-*-*	380	3	22	22	46.5	45	90	SIZE D
S6-4T30-*-*	380	3	30	30	62	60	120	SIZE D
S6-4T37-*-*	380	3	37	37	76	75	150	SIZE E
S6-4T45-*-*	380	3	45	45	92	90	180	SIZE E
S6-4T55-*-*	380	3	55	55	113	110	220	SIZE F
S6-4T75-*-*	380	3	75	75	157	152	304	SIZE F

🕮 **Note**

All S6 series servo drives are equipped with a built-in braking unit. Models of 3.7 kW and below include a built-in braking resistor, so you can use the the built-in resistor or connect an external resistor as needed.

The following braking resistor configurations are suitable for most applications. For special operating conditions or braking requirements, please consult us.

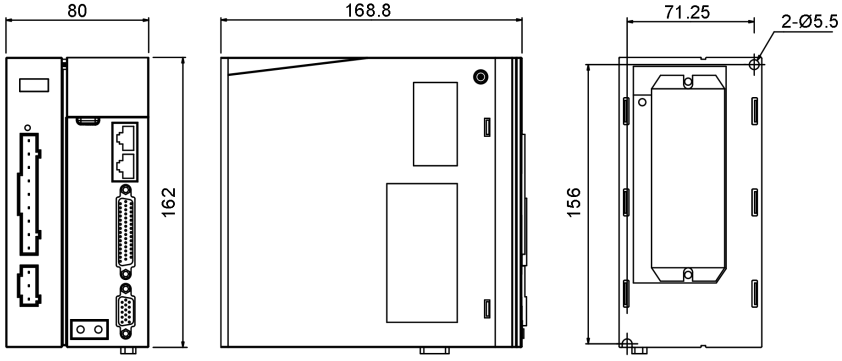
1.4 Braking resistor specifications

The related specifications of braking resistor are shown in the table below.

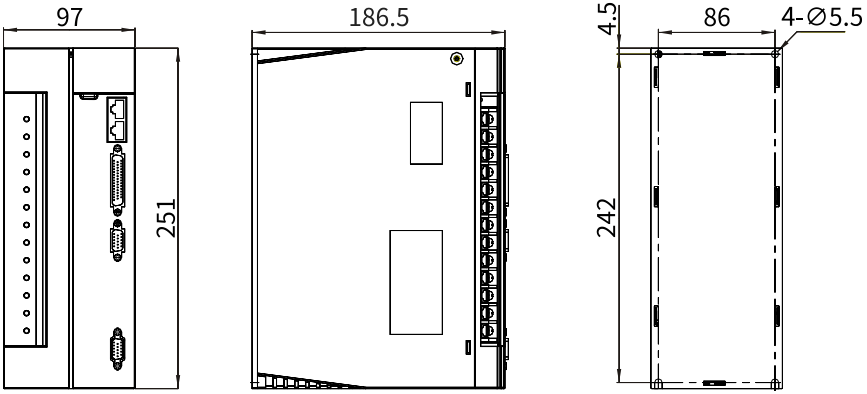
Servo drive model		Minimum allowable resistance of external braking resistor (Ω)	External resistance capacity (W)
Three-phase 380 V	S6-4T2.2-*-*	35	300
	S6-4T3.7-*-*	35	400
	S6-4T4.0-*-*	35	500
	S6-4T5.5-*-*	35	750
	S6-4T7.5-*-*	25	1000
	S6-4T11-*-*	25	1500
	S6-4T15-*-*	20	2000
	S6-4T22-*-*	15	3000
	S6-4T30-*-*	15	4000
	S6-4T37-*-*	12	4000
	S6-4T45-*-*	12	5000
	S6-4T55-*-*	7	6000
	S6-4T75-*-*	7	8000

1.5 Mounting dimensions

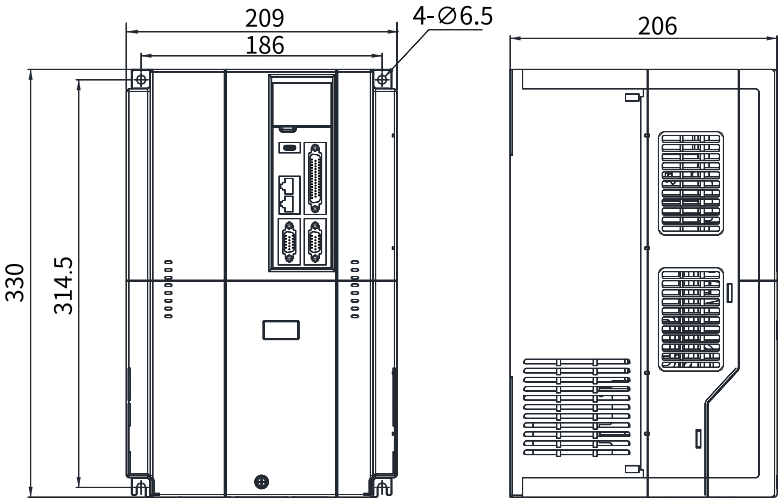
SIZE B:



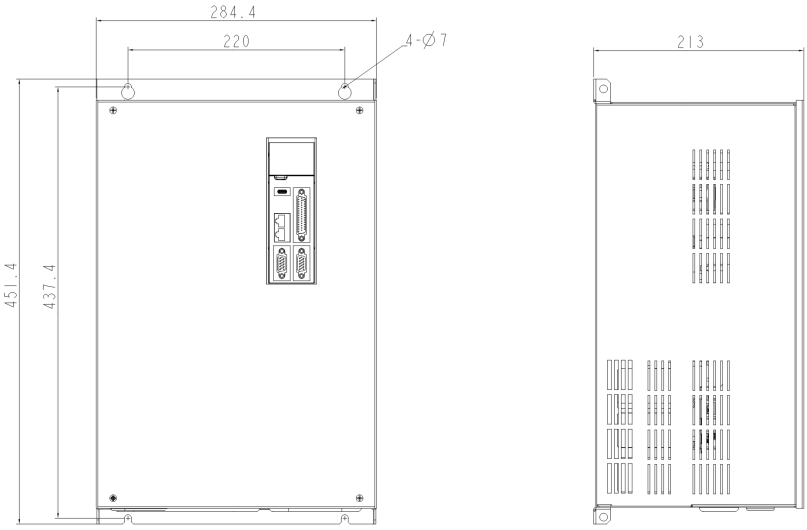
SIZE C:



SIZE D:



SIZE E:



SIZE F:

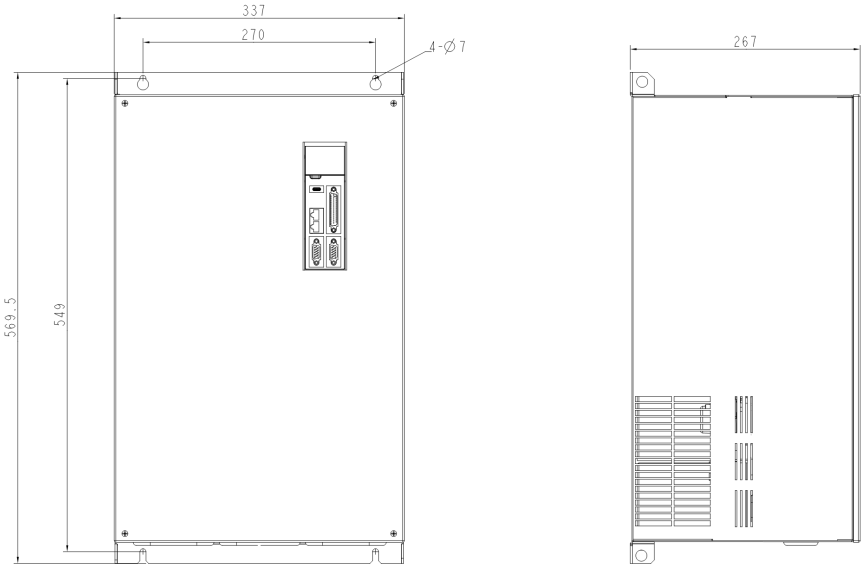


Fig. 1-3 Mounting dimensions

1.6 Name and function of main circuit terminals

Terminal type (SIZE B)

Applicable models: S6-*T2.2-*-*, S6-*T3.7-*-*

Terminal	Function
L1, L2, L3	Three-phase AC 380 V input terminals
L1C, L2C	Single-phase AC 220 V input terminals
P, PB, IR	By default, PB-IR are shorted when the internal braking resistor is in use. If braking capacity is insufficient, disconnect PB-IR and connect an external braking resistor between P-PB.
-DC	DC negative bus output terminals
U, V, W	Three-phase AC output terminals (connected to motor power cables)
PE	Power grounding terminal and motor grounding terminal (2)

Terminal type (SIZE C)

Applicable models: S6-*T4.0-*-*, S6-*T5.5-*-*, S6-*T7.5-*-*, S6-*T11-*-*

Terminal	Function
L1, L2, L3	Three-phase AC 220 V input terminals/three-phase AC 380 V input terminals
L1C, L2C	Single-phase AC 220 V input terminals
P, PB	Reserved for external braking resistor
PE	Power grounding terminal and motor grounding terminal (2)
-DC	DC negative bus output terminals
U, V, W	Three-phase AC output terminals (connected to motor power cables)

Terminal type (SIZE D/E/F)

Applicable models: S6-*T15-*-*, S6-*T22-*-*, S6-*T30-*-*、S6-*T37-*-*、S6-*T45-*-*、S6-*T55-*-*、S6-*T75-*-*

Terminal	Function
R/L1, S/L2, T/L3	Three-phase AC 380 V input terminals
P/B1, B2	Connected to the external braking resistor
PE	Power grounding terminal and motor grounding terminal (2)
+DC, P/B1	Reserved for external DC reactor, connected with copper bus upon delivery
-DC	DC negative bus output terminals
U/T1, V/T2, W/T3	Three-phase AC output terminals (connected to motor power cables)

1.7 S6NE system wiring diagram (SIZE B)

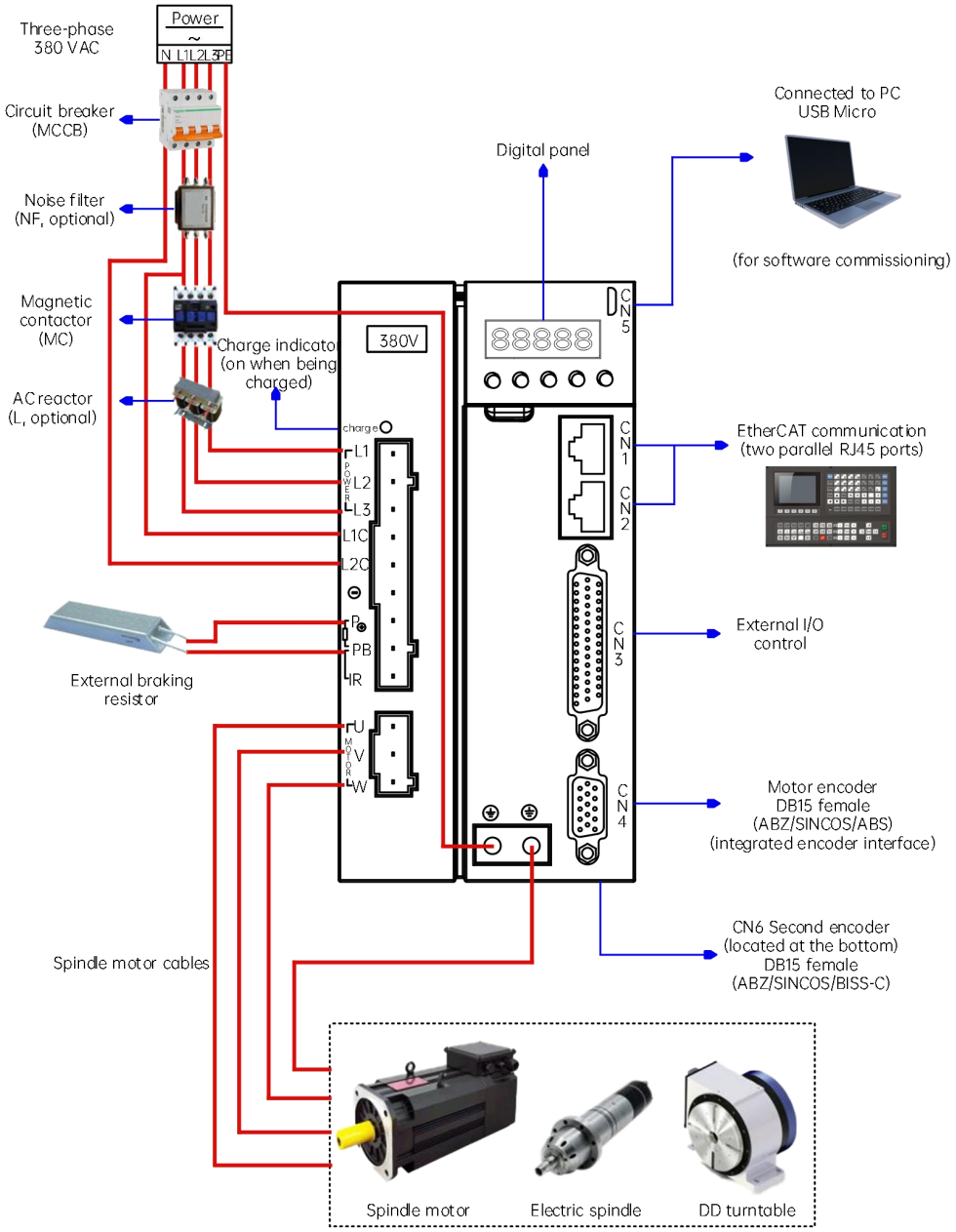


Fig. 1-4 S6NE system wiring diagram (SIZE B)

1.8 S6P system wiring diagram (SIZE C)

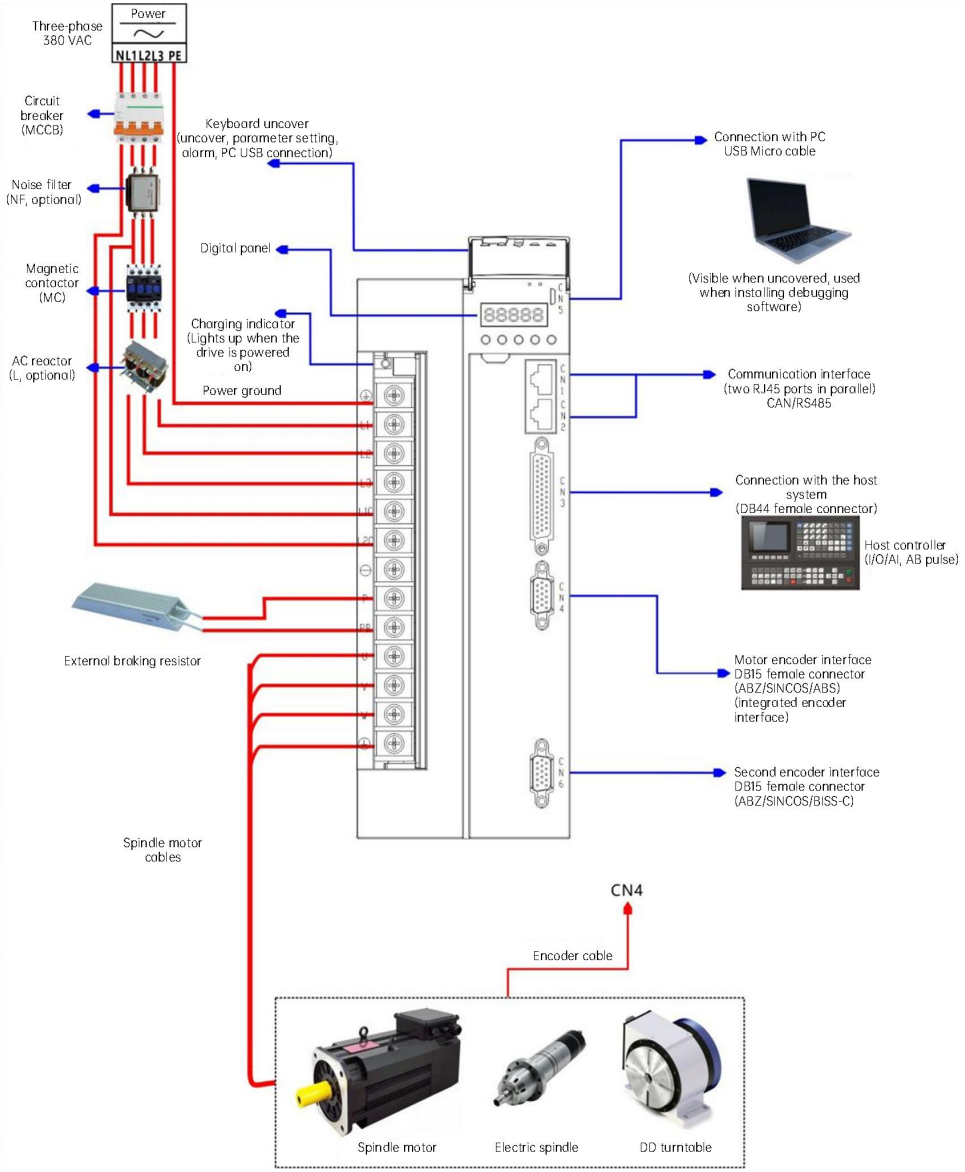


Fig. 1-5 S6P system wiring diagram (SIZE C)

1.9 S6M, S6N system wiring diagram (SIZE C)

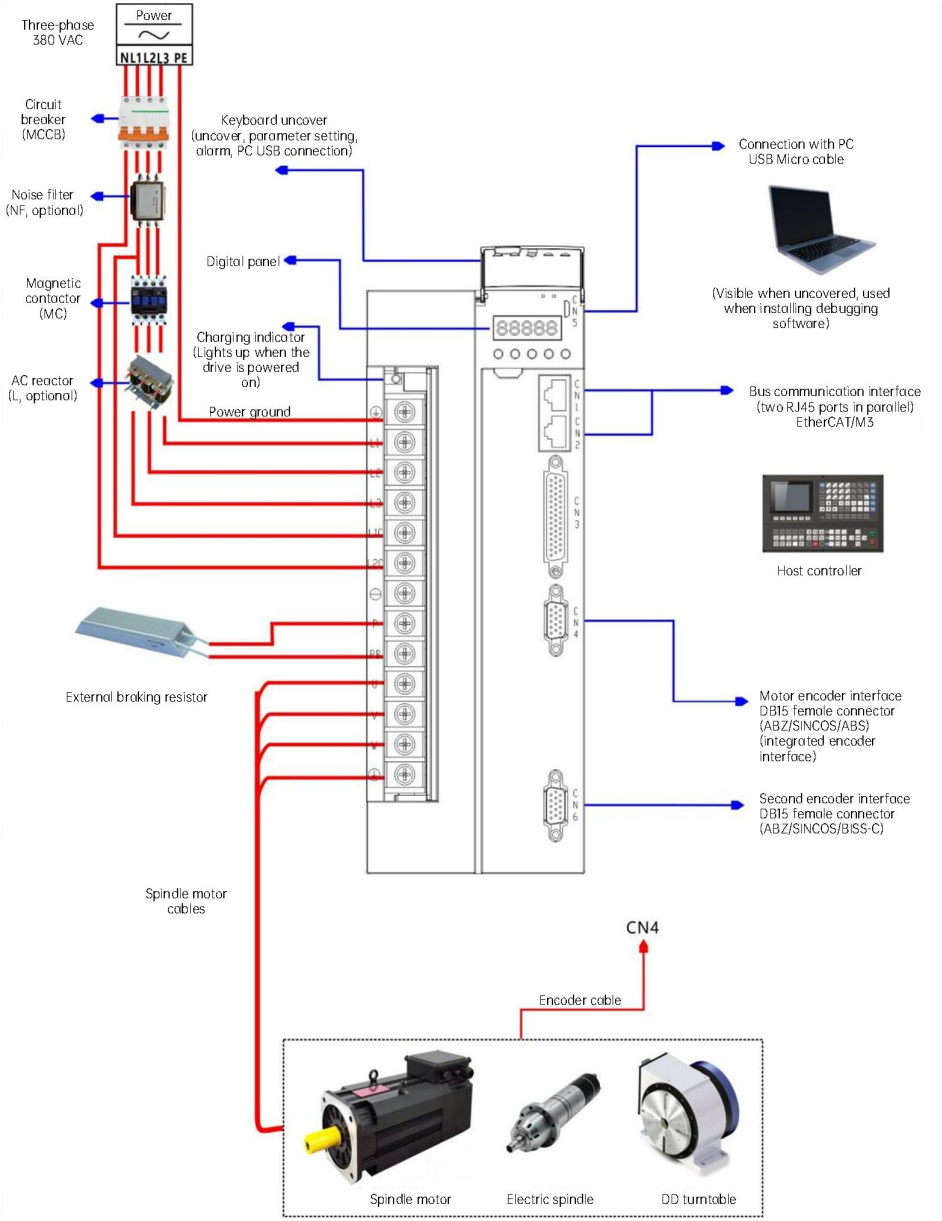


Fig. 1-6 S6M, S6N system wiring diagram (SIZE C)

1.10 S6NE system wiring diagram (SIZE D/E/F)

The following figure takes SIZE D as the example. SIZE E and SIZE F are similar.

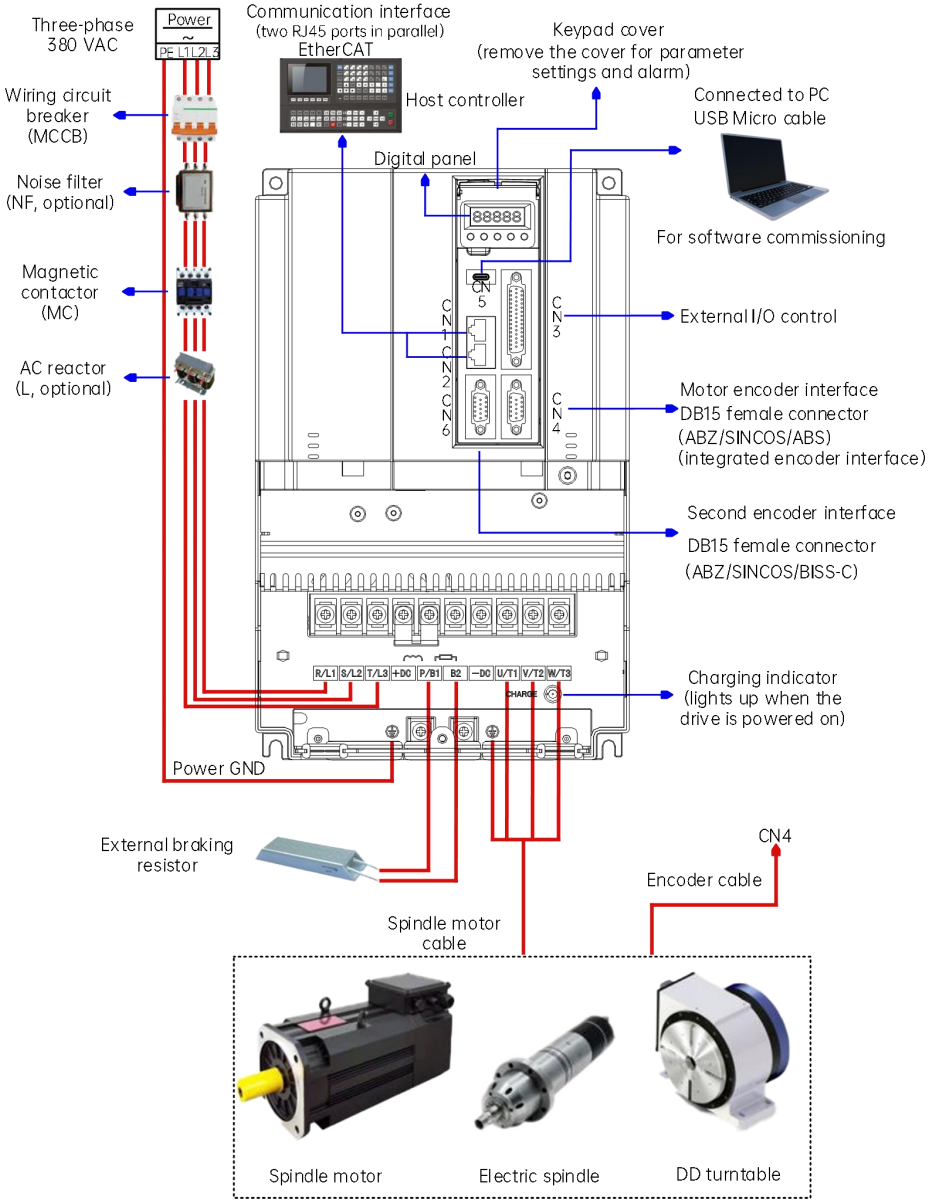


Fig. 1-7 S6NE system wiring diagram (SIZE D/E/F)

Chapter 2 System Wiring

2.1 S6NE basic wiring (SIZE B)

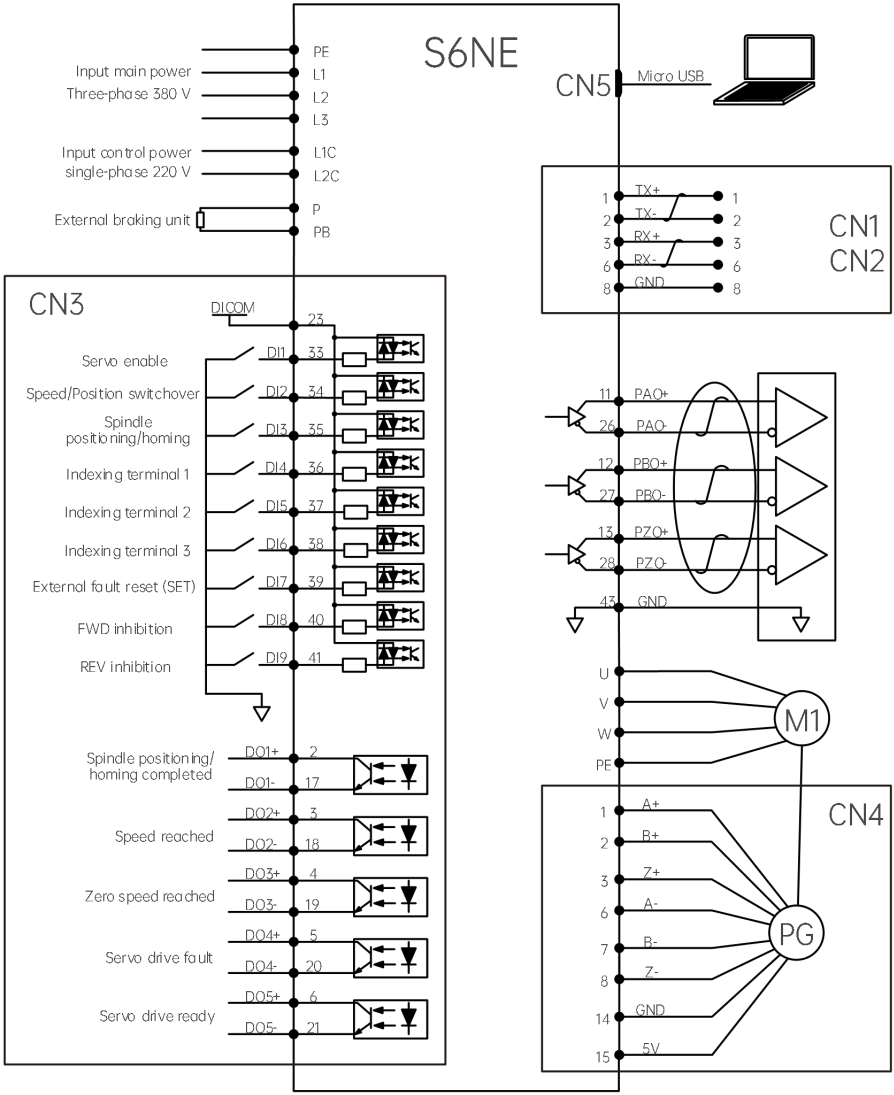


Fig. 2-1 S6NE basic wiring (SIZE B)

Note: Connect the braking resistor between PB and P.

2.2 S6P basic wiring (SIZE C)

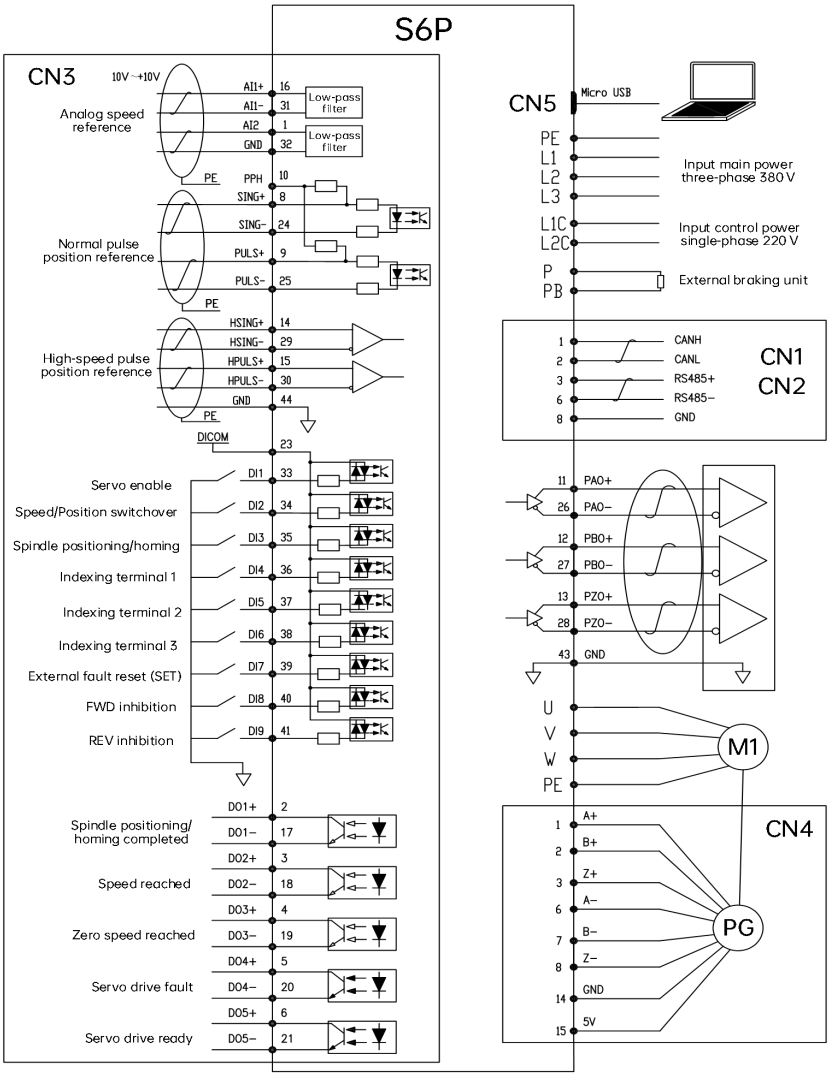


Fig. 2-2 S6P basic wiring (SIZE C)

Note: Connect the braking resistor between PB and P.

2.3 S6M basic wiring (SIZE C)

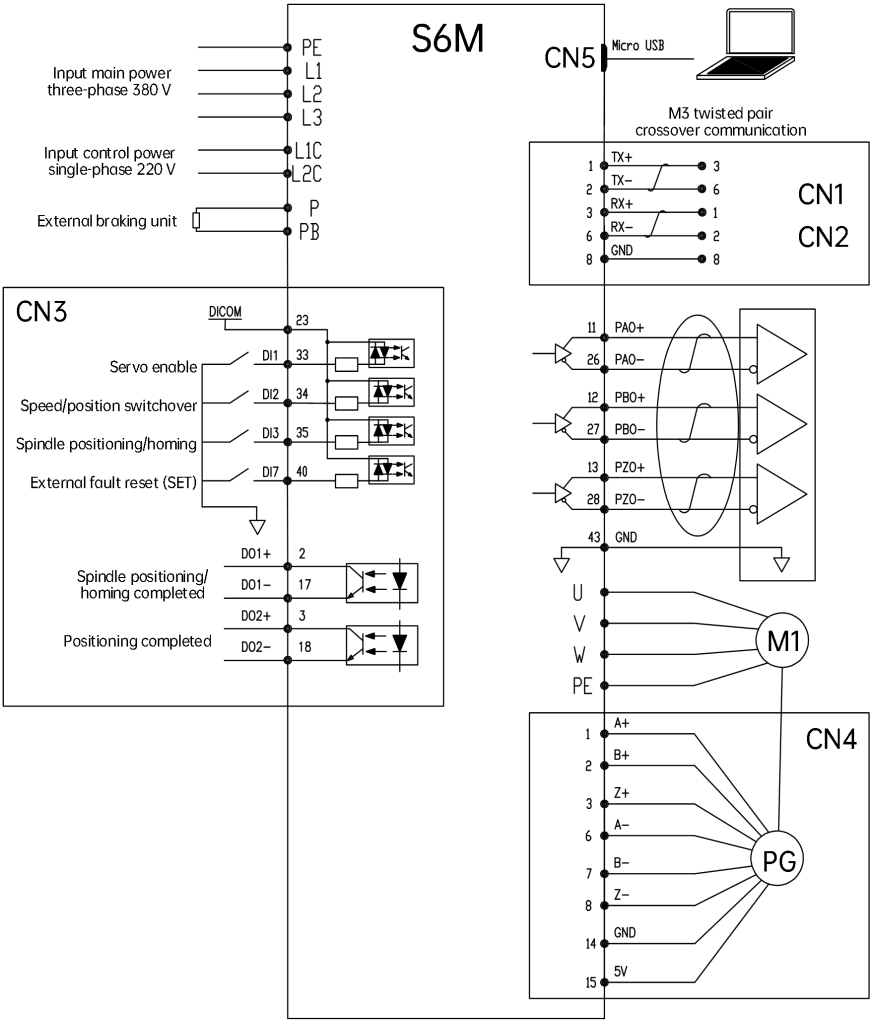


Fig. 2-3 S6M basic wiring (SIZE C)

Note: Connect the braking resistor between PB and P.

2.4 S6N basic wiring (SIZE C)

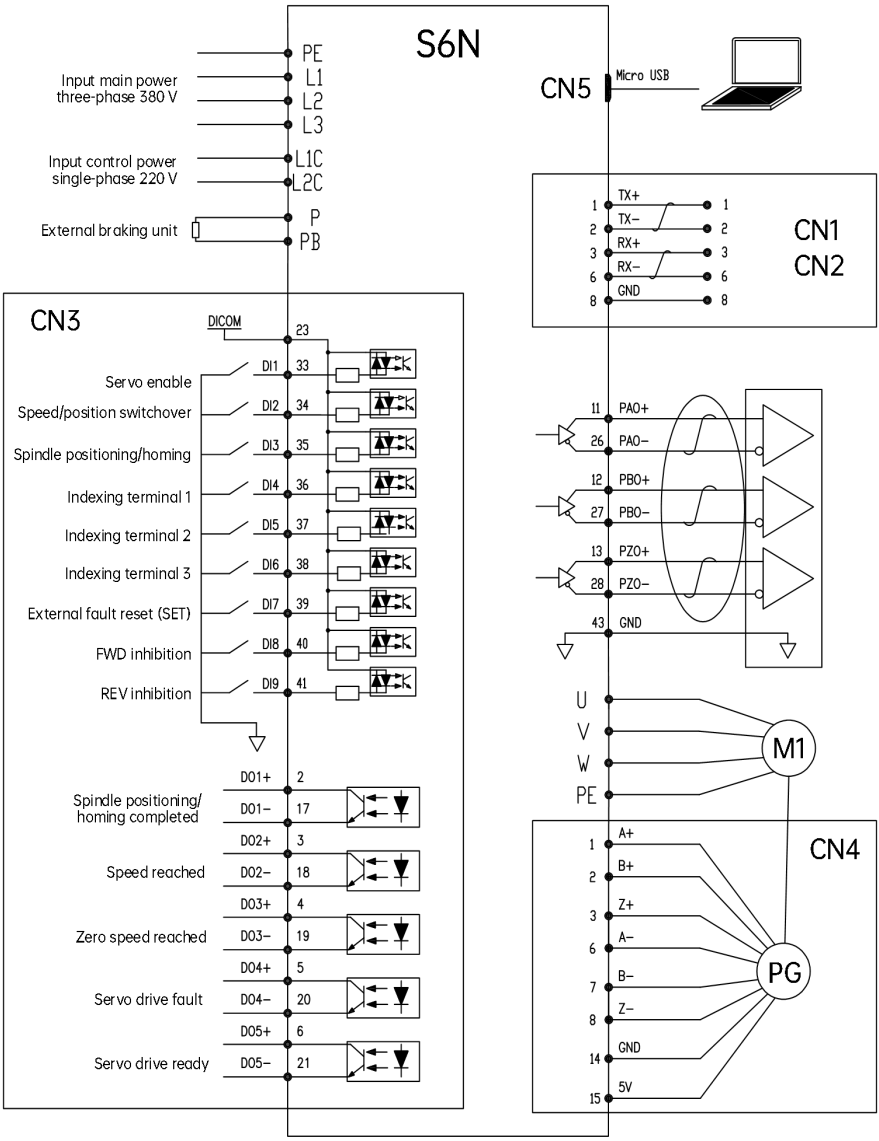


Fig. 2-4 S6N basic wiring (SIZE C)

Note: Connect the braking resistor between PB and P.

2.5 S6NE basic wiring (SIZE D/E/F)

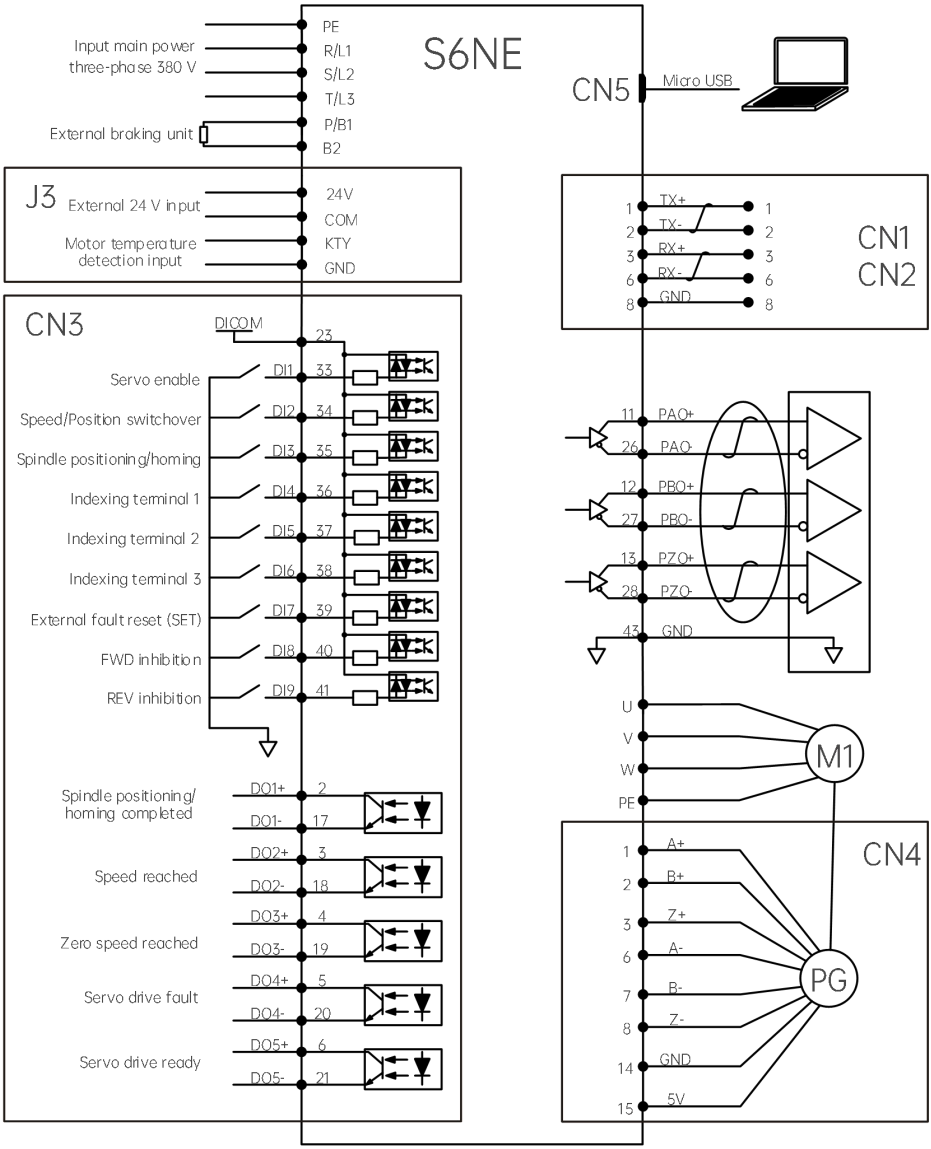


Fig. 2-5 S6NE basic wiring (SIZE D/E/F)

Note: Connect the braking resistor between P/B1 and B2.

2.6 Servo motor encoder signal connection (CN4)

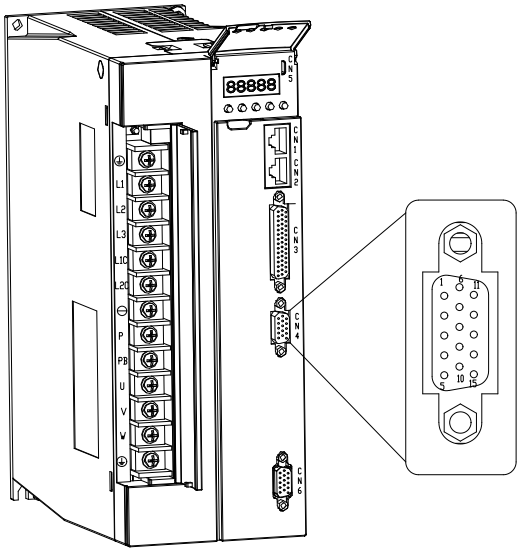


Fig. 2-6 Servo motor encoder signal connection diagram (SIZE C as the example. Similar for SIZE B)

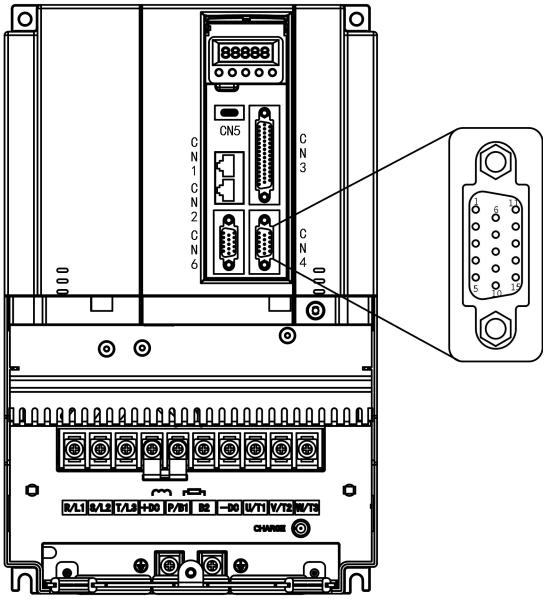


Fig. 2-7 Servo motor encoder signal connection diagram (SIZE D as the example. Similar for SIZE E and F)

The motor encoder interface of the S6 servo drive supports three types of encoders: 23-bit multi-turn absolute encoder, incremental encoder, and SinCos encoder. The three encoder interfaces are integrated into one DB15 port, and the interface signals are defined in the Table 2-1 to Table 2-3.

Table 2-1 Multi-turn absolute encoder port definition

Connection port: CN4, DB15 three row female head		
Pin	Signal name	Signal description
3	SD+	Encoder communication signal (+)
8	SD-	Encoder communication signal (-)
14	GND	Power ground
15	5V	Power +5V
Shell	PE	Shield

Table 2-2 Incremental encoder interface definition

Connection port: CN4, DB15 three row female head		
Pin	Signal name	Signal description
1	A+	Incremental differential A+ signal
2	B+	Incremental differential B+ signal
3	Z+	Incremental differential Z+ signal
6	A-	Incremental differential A- signal
7	B-	Incremental differential B- signal
8	Z-	Incremental differential Z- signal
14	GND	Power ground
15	5V	Power +5V
Shell	PE	Shield

Table 2-3 SinCos encoder interface definition

Connection port: CN4, DB15 female head		
Pin	Signal name	Signal description
4	A+	Sincos COS+ signal
5	B+	Sincos SIN+ signal
9	A-	Sincos COS- signal
10	B-	Sincos SIN- signal
11	Z+	Sincos zero + signal
12	Z-	Sincos zero - signal
14	GND	Power ground
15	5V	Power +5V
Shell	PE	Shield

Table 2-4 Temperature sensor interface definition

Connection port: CN4, DB15 female head		
Pin	Signal name	Signal description
13	KTY84+/PTC130+	Temperature detection + signal
14	KTY84-/PTC130-	Temperature detection - signal

Note: The temperature detection "-" signal needs to be connected in parallel with the encoder "GND" signal.

2.7 Second encoder interface definition (CN6)

The S6 series servo supports a second encoder for full closed-loop control.

The port of the second encoder is CN6, which is a DB15 female connector. It integrates three encoder interfaces and supports three signal types: incremental, absolute and SinCos.

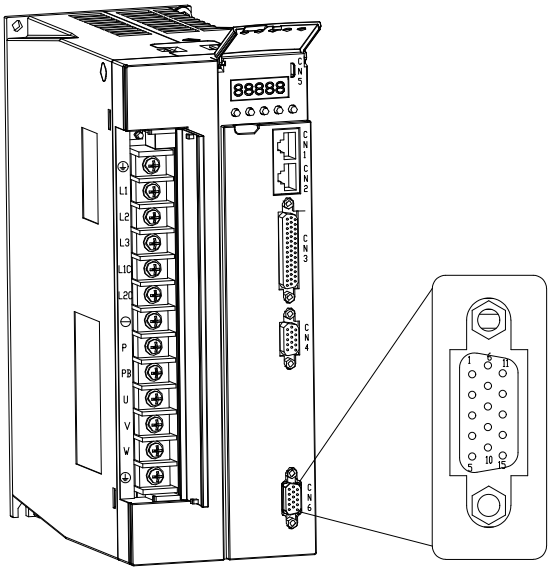


Fig. 2-8 Second encoder signal connection diagram (SIZE C as the example. For SIZE B, second encoder interface is at the bottom)

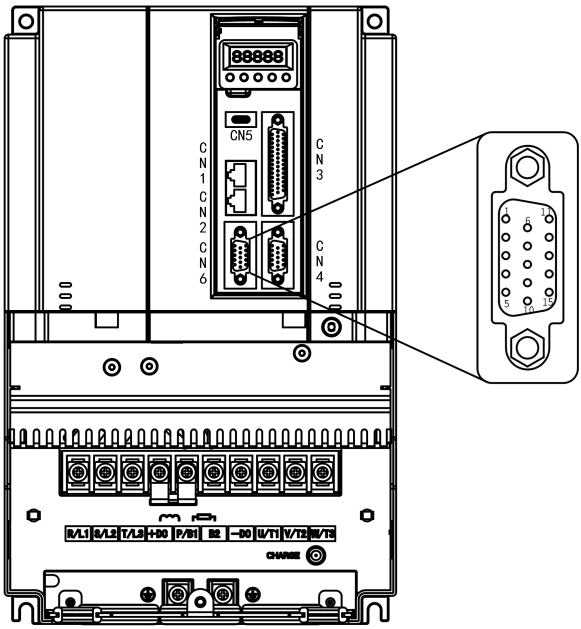


Fig. 2-9 Second encoder signal connection diagram (SIZE D as the example. Similar for SIZE E and F)

The signal definitions of different encoders are shown in the following table

Table 2-5 Second encoder port incremental encoder signal definition

Connection port: CN6, DB15 female head		
Pin	Signal name	Signal description
1	A+	Incremental differential A+ signal
2	B+	Incremental differential B+ signal
3	Z+	Incremental differential Z+ signal
6	A-	Incremental differential A- signal
7	B-	Incremental differential B- signal
8	Z-	Incremental differential Z- signal
15	5V	Power +5V
14	GND	Power ground

Table 2-6 Second encoder BISS-C definition

Connection port: CN6, DB15 female head		
Pin	Signal name	Signal description
3	SL+	Communication data signal+

Connection port: CN6, DB15 female head		
Pin	Signal name	Signal description
8	SL-	Communication data signal-
11	MA+	Communication clock signal+
12	MA-	Communication clock signal-
15	5V	Power +5V
14	GND	Power ground

Table 2-7 Second encoder port SinCos encoder signal definition

Connection port: CN6, DB15 female head		
Pin	Signal name	Signal description
4	A+	Sincos COS+ signal
5	B+	Sincos SIN+ signal
9	A-	Sincos COS- signal
10	B-	Sincos SIN- signal
11	Z+	Sincos zero + signal
12	Z-	Sincos zero - signal
15	5V	Power +5V
14	GND	Power ground

Note: When the second encoder (CN6) is a SinCos encoder, it is necessary to turn the DIP switch of the second encoder (at the groove position on the right side of the drive) to the ON position. At this time, the encoder definition switches to the SinCos definition, when there is no DIP , there will be no zero signal of SinCos encoder.

The SinCos encoder interface of the second encoder and the SinCos interface of the motor encoder (CN4) cannot be used at the same time, and the two encoder ports cannot use the same absolute encoder at the same time, but the incremental encoder can be used at the same time.

2.8 Control signal interface CN3 definition

The control signal includes digital input, digital output, analog input, pulse reference, pulse feedback and other signals. The signal connection mode is DB44, and the drive end is a DB44 female seat.

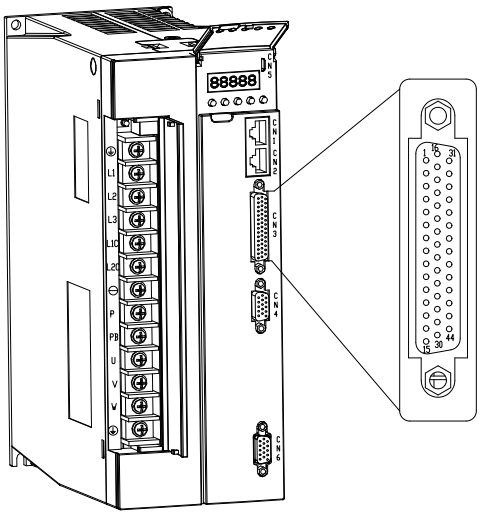


Fig. 2-10 Control signal terminal definition diagram (SIZE C as the example. Similar for SIZE B)

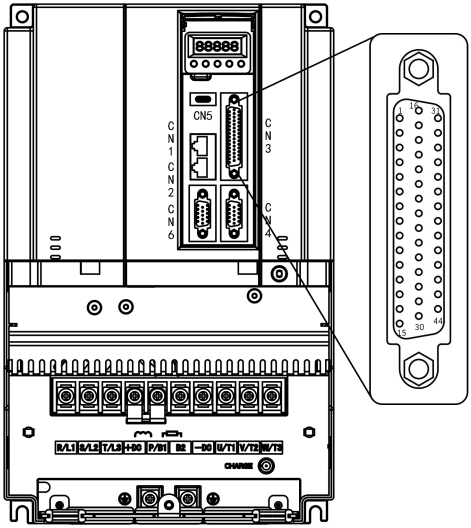


Fig. 2-11 Control signal terminal definition diagram (SIZE D as the example. Similar for SIZE E and F)

The control signal definitions are shown in the following tables.

Table 2-8 Control signal definition table (S6NE-SIZE B)

Pin	Signal name	Pin	Signal name	Pin	Signal name
1	/	16	/	31	/
2	DO1+	17	DO1-	32	/
3	DO2+	18	DO2-	33	DI1
4	DO3+	19	DO3-	34	DI2
5	DO4+	20	DO4-	35	DI3
6	DO5+	21	DO5-	36	DI4
7	/	22	/	37	DI5
8	/	23	DICOM	38	DI6
9	/	24	/	39	DI7
10	/	25	/	40	DI8
11	PAO+	26	PAO-	41	DI9
12	PBO+	27	PBO-	42	/
13	PZO+	28	PZO-	43	GND
14	/	29	/	44	GND
15	/	30	/		

Table 2-9 Control signal definition table (S6P-SIZE C)

Pin	Signal name	Pin	Signal name	Pin	Signal name
1	AI2	16	AI1+	31	AI1-
2	DO1+	17	DO1-	32	GND
3	DO2+	18	DO2-	33	DI1
4	DO3+	19	DO3-	34	DI2
5	DO4+	20	DO4-	35	DI3
6	DO5+	21	DO5-	36	DI4
7	/	22	/	37	DI5
8	SIGN+	23	DICOM	38	DI6
9	PULS+	24	SIGN-	39	DI7
10	PPH	25	PULS-	40	DI8
11	PAO+	26	PAO-	41	DI9
12	PBO+	27	PBO-	42	/
13	PZO+	28	PZO-	43	GND
14	HSIGN+	29	HSIGN-	44	GND
15	HPULS+	30	HPULS-		

Table 2-10 Control signal definition table (S6M-SIZE C)

Pin	Signal name	Pin	Signal name	Pin	Signal name
1	/	16	/	31	/
2	DO1+	17	DO1-	32	/
3	DO2+	18	DO2-	33	DI1
4	/	19	/	34	DI2
5	/	20	/	35	DI3
6	/	21	/	36	DI4
7	/	22	/	37	/
8	/	23	DICOM	38	/
9	/	24	/	39	/
10	/	25	/	40	/
11	PAO+	26	PAO-	41	/
12	PBO+	27	PBO-	42	/
13	PZO+	28	PZO-	43	GND
14	REF+	29	/	44	GND
15	REF-	30	/		

Table 2-11 Control signal definition table (S6N-SIZE C)

Pin	Signal name	Pin	Signal name	Pin	Signal name
1	/	16	/	31	AI1-
2	DO1+	17	DO1-	32	GND
3	DO2+	18	DO2-	33	DI1
4	DO3+	19	DO3-	34	DI2
5	DO4+	20	DO4-	35	DI3
6	DO5+	21	DO5-	36	DI4
7	/	22	/	37	DI5
8	/	23	DICOM	38	DI6
9	/	24	/	39	DI7
10	/	25	/	40	DI8
11	PAO+	26	PAO-	41	DI9
12	PBO+	27	PBO-	42	/
13	PZO+	28	PZO-	43	GND
14	/	29	/	44	GND
15	/	30	/		

Table 2-12 Control signal definition table (S6NE-SIZE D/E/F)

Pin	Signal name	Pin	Signal name	Pin	Signal name
1	/	16	/	31	+24V
2	DO1+	17	DO1-	32	COM
3	DO2+	18	DO2-	33	DI1
4	DO3+	19	DO3-	34	DI2
5	DO4+	20	DO4-	35	DI3
6	DO5+	21	DO5-	36	DI4
7	/	22	/	37	DI5
8	+5V	23	DICOM	38	DI6
9	HALL_V	24	HALL_U	39	DI7
10	GND	25	HALL_W	40	DI8
11	PAO+	26	PAO-	41	DI9
12	PBO+	27	PBO-	42	/
13	PZO+	28	PZO-	43	GND
14	/	29	/	44	GND
15	/	30	GND		

2.8.1 Digital input and output signals

Digital input and output signals are as shown in the following table.

Table 2-13 Digital input and output signals

Signal name		Default function	Pin No.	Function description
Common	DI1	/SON	33	Servo enable
	DI2	/Spd_Pos switch	34	Speed/Position switchover
	DI3	/S_Homing	35	Spindle positioning/homing
	DI4	/IndexTerm1	36	Indexing terminal 1
	DI5	/IndexTerm2	37	Indexing terminal 2
	DI6	/IndexTerm3	38	Indexing terminal 3
	DI7	/RESET	39	External fault reset (SET) input
	DI8	/CCWL	40	FWD inhibition
	DI9	/N-OT	41	REV inhibition
	DICOM	DI common terminal	23	DI common terminal (connect power or power ground)
	DO1+	/Home Attain	2	Spindle positioning/homing completed

Signal name		Default function	Pin No.	Function description
	DO1-		17	
	DO2+	/SAR	3	Speed reached
	DO2-		18	
	DO3+	/Zero SPD	4	Zero speed reached
	DO3-		19	
	DO4+	/ALM	5	Servo drive fault
	DO4-		20	
	DO5+	/SRDY	6	Servo drive ready
	DO5-		21	

2.8.1.1 Digital input circuit

S6 series servo has 9 DI terminals in total. The DI common terminal can be connected to power supply or ground, and supports dry contact input, NPN input and PNP input.

S6 series servo does not provide 24 V power supply to the outside, and the connection of DI uses external power supply.

Take DI1 as an example, interface circuits of DI1-DI9 are the same.

(1) Dry contact mode

The dry contact wiring method is as shown in the following figure.

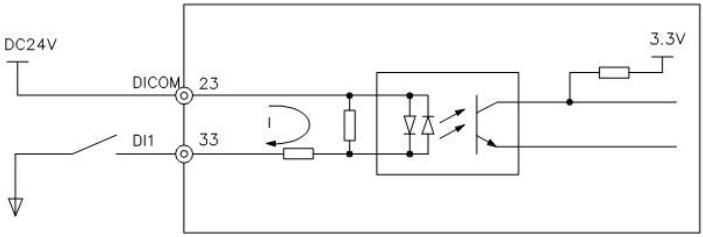


Fig. 2-12 DI terminal dry contact connection mode

(2) NPN (drain) mode

The external controller is the NPN common emitter output, and the wiring mode is as shown in the following figure.

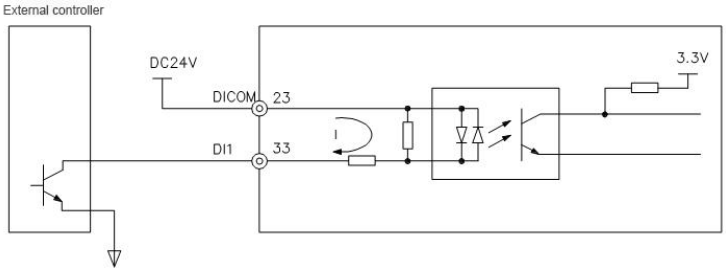


Fig. 2-13 DI terminal NPN connection mode

(3) PNP (source) mode

The external controller is the PNP common emitter output, and the wiring mode is as shown in the following figure.

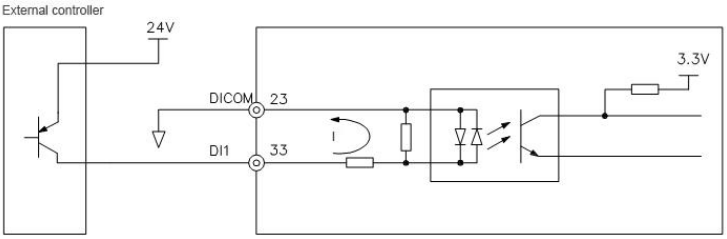


Fig. 2-14 DI terminal PNP connection mode

Note: The NPN and PNP modes of multiple DI terminals of the same drive cannot be mixed.

2.8.1.2 Digital output circuit

The DO terminal is a double-ended output, which can have various output modes. There is no internal power supply, and an external power supply must be used. Taking DO1 as an example, the interface circuits of DO1-DO5 are the same.

(1) The host device is relay input

When the external device is a relay input, the wiring mode is as shown in the following figure.

Warning: The inductive load (such as relay) shall be anti-parallel with the fly-wheel diode!

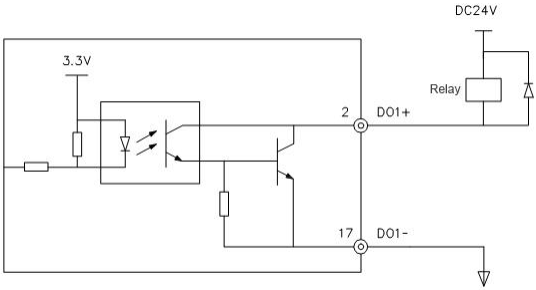


Fig. 2-15 DO terminal connection relay wiring mode

(2) Drain (NPN) output

When the controller input is a drain input, the wiring mode is as shown in the following figure.

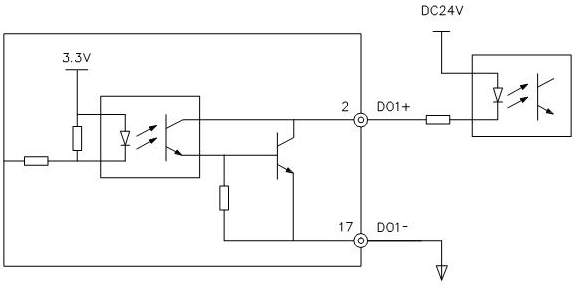


Fig. 2-16 DO terminal drain (NPN) output wiring mode

(3) Source (PNP) output

When the controller input is a source input, the wiring mode is as shown in the following figure.

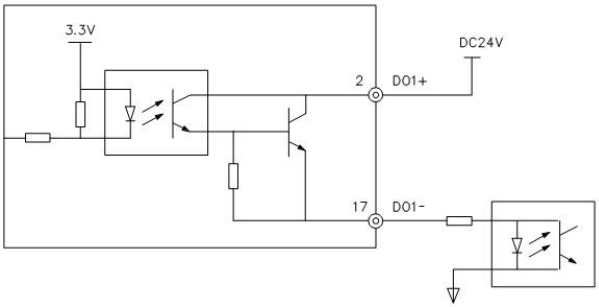


Fig. 2-17 DO terminal source (PNP) output wiring mode

2.8.2 Analog input signal

Table 2-14 Analog input signal

Signal name		Pin No.	Function description
Analog	AI1+	16	Analog input 1, differential input, resolution: 16-bit, support voltage input Voltage range: -10V~+10V
	AI1-	31	
	AI2	1	Analog input 2, single-ended input, resolution: 12-bit, support voltage input Voltage range: 0V~+10V
	GND	32	

Voltage input range: -10V~ +10V;

Maximum input voltage: ± 11V;

Input inductance: single-ended input about 17kΩ, differential input about 12 kΩ.

(1) AI1 receiving differential voltage input wiring diagram

The wiring mode is as shown in the following figure.

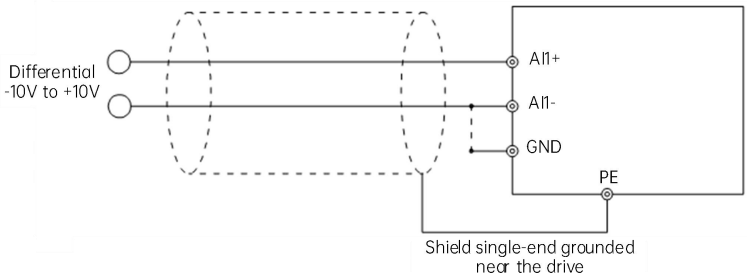


Fig. 2-18 AI1 differential voltage input wiring diagram

Note: In most cases, shorting AI1- and GND can improve input stability.

(2) AI1 receiving single-ended voltage input wiring diagram

The wiring mode is as shown in the following figure.

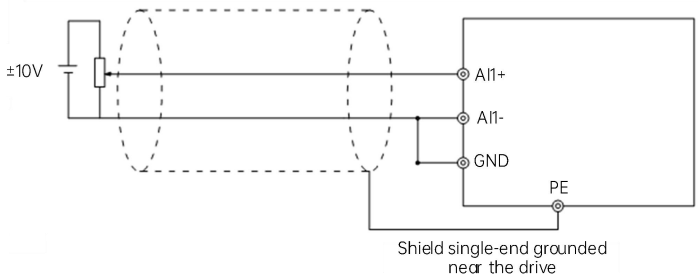


Fig. 2-19 AI1 single-ended voltage input wiring diagram

(3) AI2 receiving single-ended voltage input wiring diagram

The wiring mode is as shown in the following figure.

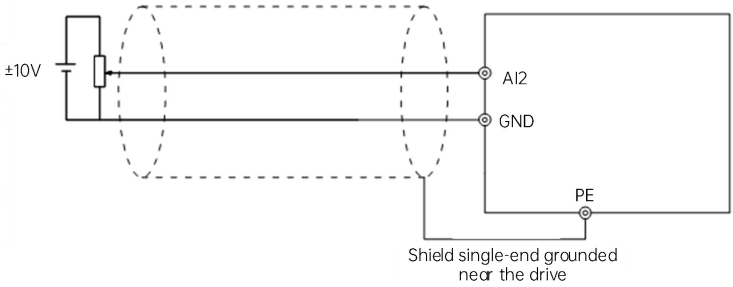


Fig. 2-20 AI2 single-ended voltage input wiring diagram

2.8.3 Position command input signal

Table 2-15 Position command input signal

Signal name		Pin No.	Function	
Position command	PULS+	9	Low speed pulse command Open collector input Push-pull input Differential input	Pulse input mode: Puls+Sign CW/CCW A / B phase quadrature
	PULS-	25		
	SIGN+	8		
	SIGN-	24		
	HPULS+	15	High-speed pulse command Differential input	Pulse input mode: Puls+Sign CW/CCW A / B phase quadrature
	HPULS-	30		
	HSIGN+	14		
	HSIGN-	29		
	PPH	10	External power input interface of command pulse	
	GND	43/44	Differential input pulse signal ground	

There are two channels for pulse command input: low-speed pulse command input and high-speed pulse command input. The former supports differential input and open-collector input, while the latter only supports differential input. Its input maximum frequency and minimum pulse width are shown in the table below.

Table 2-16 Pulse input specification requirements

Pulse channel	Supported input mode	Maximum input frequency	Minimum pulse width	Voltage specification	Current consumption
Low-speed pulse input	Open-collector input	200Kpps	2.5us	24V	<10mA
	Differential input	500Kpps	1us	5V	<10mA
High-speed pulse input	Differential input	4Mpps	0.125us	5V	<5mA

2.8.3.1 Low-speed pulse command input

(1) The host device is 5V differential mode output

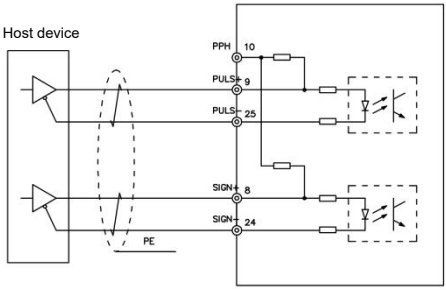


Fig. 2-21 Low-speed pulse command differential input wiring diagram

(2) The host device is open collector NPN output

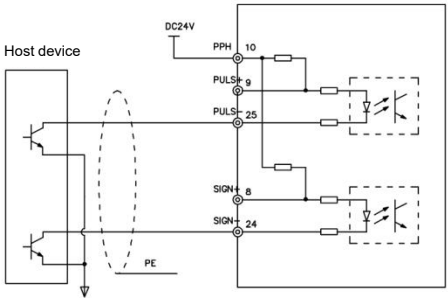


Fig. 2-22 Low-speed pulse command NPN input wiring diagram

(3) The host device is open collector PNP output

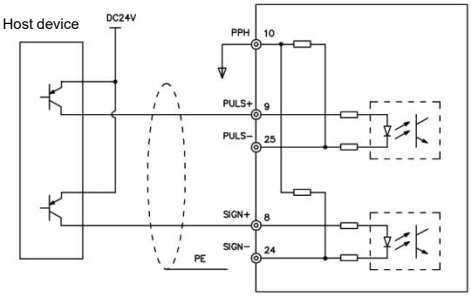


Fig. 2-23 Low-speed pulse command PNP input wiring diagram

2.8.3.2 High-speed pulse input

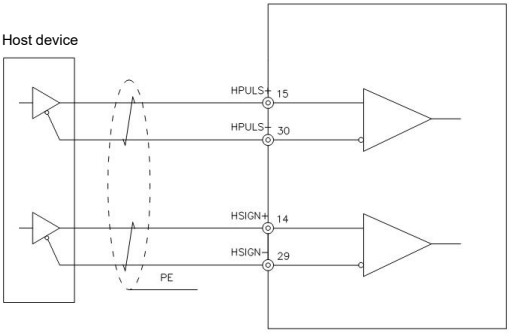


Fig. 2-24 High-speed pulse input wiring diagram

2.8.4 Encoder frequency-division output circuit

Table 2-17 Encoder frequency-division output signal

Signal name		Pin No.	Function	
Common	PAO+ PAO-	11 26	Phase A frequency-division output signal	A, B quadrature pulse frequency-division output
	PBO+ PBO-	12 27	Phase B frequency-division output signal	
	PZO+ PZO-	13 28	Phase Z frequency-division output signal	Origin signal
	GND	43/44	Pulse signal ground	

Encoder frequency-division output wiring is as shown in the following figures.

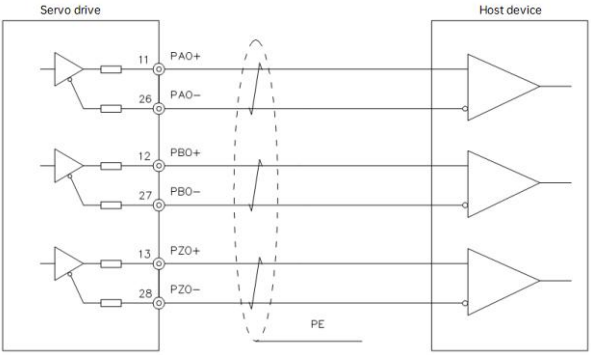


Fig. 2-25 Encoder frequency-division output wiring 1

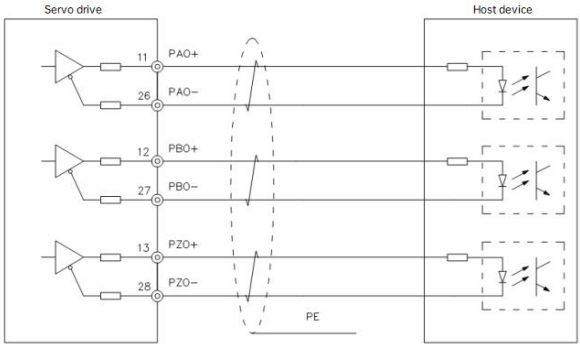


Fig. 2-26 Encoder frequency-division output wiring 2

2.8.5 Motor HALL signal input circuit

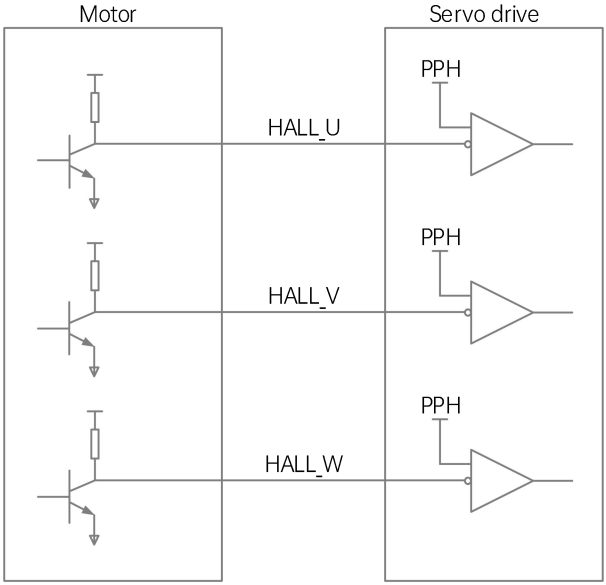


Fig. 2-27 Motor HALL signal input wiring diagram

Table 2-18 Motor HALL input signal

Signal	Pin	Function
+5V	8	Power supply
GND	10	Signal GND
HALL_U	24	Phase U HALL input signal
HALL_V	9	Phase V HALL input signal
HALL_W	25	Phase W HALL input signal

2.9 Communication port wiring

S6 series servo supports RS485, CANopen, EtherCAT, MECHATROLINK-III communication. The communication ports are CN1 and CN2, which are two RJ45 ports connected in parallel, which is convenient for multi-site cascading, the two ports go from top to bottom.

Among them, CAN supports CANopen protocol and implements CiA 402 sub-protocol; RS485 supports standard driver MODBUS protocol; EtherCAT supports CoE and SoE communication protocols and follows the CiA402 profile; MECHATROLINK-III supports Yaskawa MECHATROLINK-III bus communication protocol.

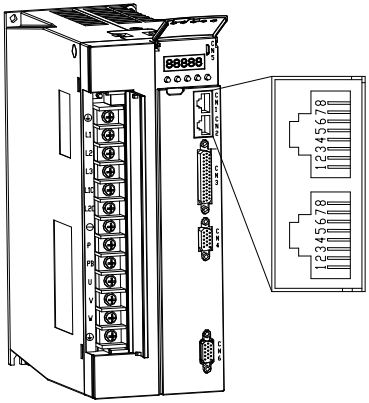


Fig. 2-28 Communication interface connection diagram (SIZE C as the example. Similar for SIZE B)

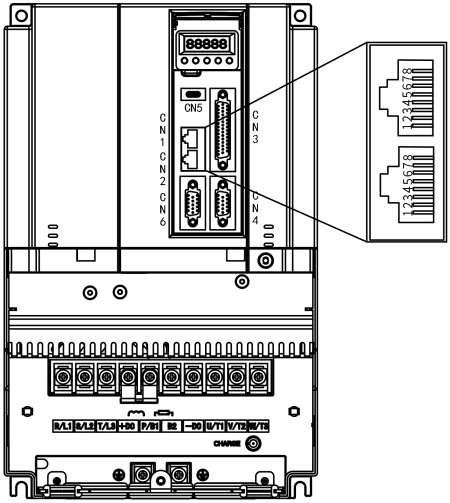


Fig. 2-29 Communication interface connection diagram (SIZE D as the example. Similar for SIZE E and F)

Table 2-19 CAN/RS485 communication port signal definition table

Pin No.	Definition	Description
1	CANH	CAN port
2	CANL	
3	485+	RS485
6	485-	
8	GND	Communication ground
4/5/7	Undefined	

Table 2-20 MECHATROLINK-III bus communication definition table

Pin No.	568A	568B
1	TX+	RX+
2	TX-	RX-
3	RX+	TX+
6	RX-	TX-
8	GND	Communication ground
4/5/7	Undefined	

Table 2-21 EtherCAT bus communication definition table

Pin No.	568A	568B
1	TX+	TX+
2	TX-	TX-
3	RX+	RX+
6	RX-	RX-
8	GND	Communication ground
4/5/7	Undefined	

Chapter 3 Parameter Settings

3.1 Application parameters

3.1.1 Basic parameters

Function code	Name	Setting range	Default value	Change
P01.00	Motor and control mode selection	Unit place: Control mode selection of the motor 0: Reserved 1: Vector control with PG 2: V/F control without PG Tens place: Type selection of the motor 0: Asynchronous motor 1: Synchronous motor	01	×
P02.00	Control mode selection	0: Speed mode 1: Position mode 2: Torque mode 3: Speed mode ← → position mode (9th function switching) 4: Torque mode ← → position mode (9th function switching) 5: Speed mode ← → torque mode (9th function switching) 6: Speed mode ← →torque mode ← → position mode (9th function switching torque, 10th function switching position, It does not switch when it is valid at the same time or invalid at the same time, and it remains in the speed mode) 7: CANopen mode 8: EtherCAT mode 9: M3 mode	0	×
P02.01	Internal servo enable	0~1	0	○
P06.00	Main reference source selection	0: Digital reference (P06.01) 1: AI1 analog reference 2: AI2 analog reference	0	○

Function code	Name	Setting range	Default value	Change
		3: Serial port communication reference 4: Multi-step speed reference (auxiliary reference is not supported) 5: Pulse input reference		
P06.01	Main reference speed setting	-60000~60000rpm	500rpm	○
P06.07	Speed command acceleration time 1	0~65535ms	6000ms	○
P06.08	Speed command deceleration time 1	0~65535ms	6000ms	○
P06.09	Maximum speed threshold	0~9000rpm	5000rpm	○
P06.10	Forward speed threshold	0~9000rpm	5000rpm	○
P06.11	Reverse speed threshold	0~9000rpm	5000rpm	○

Note

(1) P01.00 setting is determined by the customer's site. For example: asynchronous motor + encoder, you need set P01.00 to 01.

(2) P06.00 can set the main reference frequency source for speed control, it can be analog, and also can be pulse.

3.1.2 Motor parameters

Function code	Name	Setting range	Default value	Change
P01.01	Rated power	0.04~99.99kW	Depending on model	×
P01.02	Rated voltage	0~9999V	380V	×
P01.03	Rated current	0.1~999.9A	Depending on model	×
P01.04	Rated torque	0.1~655.35N·m	Depending on model	×
P01.05	Maximum torque	0.1~655.35N·m	Depending on model	×
P01.06	Rated frequency	1.00~3000.00Hz	50.00	×
P01.07	Rated speed	0~60000rpm	1450rpm	×
P01.08	Maximum speed	0~60000rpm	9000rpm	×

Function code	Name	Setting range	Default value	Change
P01.09	Rotor inertia Jm	0.1kg*cm^2~6553.5kg*cm^2	Depending on model	×
P01.10	Number of pole pairs	2~72 pairs of poles	2	×
P01.11	Stator resistance R1	0.001~65.000Ω	Depending on model	×
P01.12	Motor leakage inductance or direct axis inductance Ld	0.01~655.35mH	Depending on model	×
P01.13	Motor mutual inductance or q-axis inductance Lq	0.01~655.35mH	Depending on model	×
P01.14	Motor rotor resistance or back EMF constant	0.001~65.000Ω(V/rpm)	Depending on model	×
P01.15	Motor no-load current	0.1~999.9A	Depending on model	×

3.1.3 Encoder parameters

Function code	Name	Setting range	Default value	Change
P01.17	Encoder selection	0: Line-saving incremental encoder (ABZ) 1: Tamagawa serial intelligent 23-bit absolute encoder 2: SinCos encoder 3: BISS-C encoder	0	×
P01.18	Number of encoder lines	1~1073741824	2500	×
P02.04	Encoder frequency-division output pulses	1~131072P/Rev	2500	○
P02.05	Pulse output source selection	0: Motor encoder frequency-division output 1: Pulse command synchronous output 2: Frequency-division or synchronous output disabled	0	○
P02.06	Output pulse direction selection	0: A before B 1: B before A	0	○
P02.07	Z pulse output polarity selection	0: Positive output (Z pulse is high level) 1: Negative output (Z pulse is low level)	0	○

3.1.4 Loop gain parameters

Function code	Name	Setting range	Default value	Change
P08.00	Speed loop proportional gain 1	0.1~3276.7	9	○
P08.01	Speed loop integral time 1	0.0~1000.0ms	60	○
P08.02	Position loop gain 1	0.1~3000.0	11.5	○
P08.03	Speed regulator output filter time 1	0~32.00ms	3	○
P08.04	Speed loop proportional gain 2	0.1~3276.7	9	○
P08.05	Speed loop integral time 2	0.1~3000.0ms	60	○
P08.06	Position loop gain 2	1~8000	11.5	○
P08.07	Speed regulator output filter time 2	0~32.00ms	3	○
P09.06	Gain adjustment mode	0: The parameter self-adjustment is invalid, and the parameter is adjusted manually 1: Parameter self-adjustment mode, use the rigidity table to automatically adjust the gain parameters 2: Positioning mode, use the rigidity table to automatically adjust the gain parameters	0	×
P09.07	Rigidity level	0~31	8	○

3.1.5 Multi-function input and output

Function code	Name	Setting range	Default value	Change
P03.00	DI1 terminal function	1: Servo enable	1	×
P03.01	DI2 terminal function	89: Speed/Position switchover terminal	89	
P03.02	DI3 terminal function	85: Spindle positioning/homing terminal	85	
P03.03	DI4 terminal function	86: Spindle indexing terminal 1	86	
P03.04	DI5 terminal function	87: Spindle indexing terminal 2	87	
P03.05	DI6 terminal function	88: Spindle indexing terminal 3	88	
P03.06	DI7 terminal function	22:External fault reset (SET) input	22	
P03.07	DI8 terminal function	41: FWD inhibition	41	
P03.08	DI9 terminal function	42: REV inhibition	42	
P03.15	DO1 function selection	30: Spindle positioning/homing completed	30	×
P03.16	DO2 function selection	1: Speed reached	1	

Function code	Name	Setting range	Default value	Change
P03.17	DO3 function selection	11: Zero speed reached	11	
P03.18	DO4 function selection	16: Servo drive fault	16	
P03.19	DO5 function selection	15: Servo drive ready	15	

3.1.6 Analog input

Function code	Name	Setting range	Default value	Change
P04.00	AI1 offset	-5000~5000	0	×
P04.01	AI1 filter	0.0~6000.0	20.0ms	×
P04.02	AI1 dead zone	0~1000.0	10.0mV	×
P04.03	AI1 zero drift	-1000.0~1000.0	0.0mV	×
P04.12	AI2 offset	-5000~5000	0	×
P04.13	AI2 filter	0.0~6000.0	20.0ms	×
P04.14	AI2 dead zone	0~1000.0	10.0mV	×
P04.15	AI2 zero drift	-1000.0~1000.0	0	×

3.1.7 Pulse input

Function code	Name	Setting range	Default value	Change
P05.00	Position reference mode	0: Pulse reference 1: Single point position reference 2: Multi-segment position reference	0	×
P05.01	Pulse command input terminal selection	0: Low-speed terminal 1: High-speed terminal	0	×
P05.02	Pulse command mode	0: A/B phase pulse 1: PLUS+SIGN 2: CW/CCW pulse	0	×
P05.03	Pulse command logic	0: Positive logic 1: Inverse logic	0	×
P05.05	Pulses for one motor revolution	0~8388608 P/r	2500	×
P05.06	Position command first-order low-pass filter time	0.0~2000.0ms	13.1	○

Function code	Name	Setting range	Default value	Change
P05.07	Position command moving average filter time	0.0~128.0ms	1.0	○

🕮 **Note**

Pulse input pulse frequency is higher than 200 kHz, high-speed port is recommended.

3.1.8 Motor temperature detection

Function code	Name	Setting range	Default value	Change
P10.11	Motor temperature detection type	0: PTC130 1: KTY84	0	×
P10.13	Motor overheat alarm temperature	0.0~200.0℃	130.0	×
P11.30	Motor temperature	-40.0~200.0℃	-	*

The drive integrates the motor temperature sensor interface on the CN4 port: Pin13(KTY+)/Pin14(KTY-). This interface supports both KTY_84_130 and PTC130 sensors.

3.1.9 Spindle indexing parameters

Function code	Name	Setting range	Default value	Change
P12.00	Spindle indexing selection	0: Indexing disabled 1: Indexing enabled	0	○
P12.01	Homing mode	Origin detector types and looking for direction settings 0: Homing according to the current running direction, CCWL as a return to the origin 1: Homing according to the current running direction, CWL as a return to the origin 2: Forward homing, ORGP as a return to the origin 3: Reverse homing, ORGP as a return to the origin 4: The shortest distance homing, ORGP as a return to the origin 5: Homing according to the current running direction, ORGP as a return to the origin	9	○

Function code	Name	Setting range	Default value	Change
		6: Forward looking for Z pulse as a return to the origin 7: Reverse looking for Z pulse as a return to the origin 8: The shortest distance looking for Z pulse as a return to the origin 9: Homing according to the current direction, Z pulse as a return to the origin		
P12.08	Origin search speed	1~300rpm	10	×
P12.09	Origin position offset	0~360.000	180.000	○
P12.12	Indexing angle 1	0.000~359.999	0	○
P12.13	Indexing angle 2	0.000~359.999	0	○
P12.14	Indexing angle 3	0.000~359.999	0	○
P12.15	Indexing angle 4	0.000~359.999	0	○
P12.16	Indexing angle 5	0.000~359.999	0	○
P12.17	Indexing angle 6	0.000~359.999	0	○
P12.18	Indexing angle 7	0.000~359.999	0	○
P12.19	Indexing angle 8	0.000~359.999	0	○
P12.20	Indexing angle 9	0.000~359.999	0	○
P12.21	Indexing angle 10	0.000~359.999	0	○
P12.22	Indexing angle 11	0.000~359.999	0	○
P12.23	Indexing angle 12	0.000~359.999	0	○
P12.24	Indexing angle 13	0.000~359.999	0	○
P12.25	Indexing angle 14	0.000~359.999	0	○
P12.26	Indexing angle 15	0.000~359.999	0	○
P12.27	Indexing angle 16	0.000~359.999	0	○
P12.28	Positioning speed	0~2000rpm	500	○
P12.29	Positioning acceleration time	0.01~300.00s	2.00	○
P12.30	Positioning deceleration time	0.01~300.00s	2.00	○

3.2 Monitoring parameters

Function code	Name	Setting range	Default value	Change
P11.01	Actual motor speed	-60000~60000rpm	-	*
P11.02	Output voltage	0~480V	-	*
P11.03	Output current	0.0~4Ie	-	*
P11.08	Bus voltage	0~900V	-	*
P11.09	Control voltage	0~450V	-	*
P11.11	DI terminal state	0~3FFH, 0: off; 1: on The high-speed pulse reference will not be refreshed synchronously	-	*
P11.12	DO terminal state	0~FH, 0: open; 1: close The high-speed pulse output will not be refreshed synchronously	-	*
P11.13	AI1 input voltage	-10.00~10.000V	-	*
P11.14	AI2 input voltage	-10.00~10.000V	-	*
P11.17	Input pulse frequency	0~4000.0kpps	-	*
P11.18	Corresponding speed of input pulse command	-9000~9000rpm	-	*
P11.19	Motor encoder counter value	0~4 times motor encoder lines -1	-	*
P11.20	Motor encoder Z pulse position	0~4 times motor encoder lines -1	-	*
P11.23	Position reference	-2147483648~2147483647	-	*
P11.24	Position feedback	-2147483648~2147483647	-	*
P11.25	Position error pulse	-2147483648~2147483647	-	*
P11.26	Position reference point position (PUU unit)	-2147483648~2147483647	-	*
P11.27	Position reference (PUU unit)	-2147483648~2147483647	-	*
P11.28	Position feedback (PUU unit)	-2147483648~2147483647	-	*
P11.29	Position error pulse (PUU unit)	-2147483648~2147483647	-	*
P11.36	Load moment of inertia ratio	0.00~120.00	-	*
P11.37	SinCos encoder signal amplitude	0~30000	-	*

Function code	Name	Setting range	Default value	Change
P11.38	SinCos encoder count value (after subdivision)	0~8388608	-	*
P11.39	SinCos encoder Z pulse position (after subdivision)	0~8388608	-	*
P11.40	SinCos encoder one-turn resolution (after subdivision)		-	*
P11.41	SinCos encoder count value (after quadrupling frequency according to P05.05)	0~8388608	-	*
P11.42	SinCos encoder Z pulse position (after quadrupling frequency according to P05.05)	0~8388608	-	*
P11.45	Mechanical angle (number of pulses from origin)	0.000~359.999°	-	*

3.3 System parameters

Function code	Name	Setting range	Default value	Change
P02.21	Parameter protection setting	0: All the data can be changed; 1: Only P06.01 and this function code can be changed 2: Only this function code can be changed	0	○
P02.22	Parameter initialization	0: Parameter changing status 1: Clear fault memory information 2: Restore to leave-factory value	0	×

Chapter 4 Functions and Applications

4.1 Interface introduction

S6 servo drive operating interface consists of five LED digital tube and 5 keys, it can be used for working status display and parameter settings.

Interface appearance as shown in the figure below.

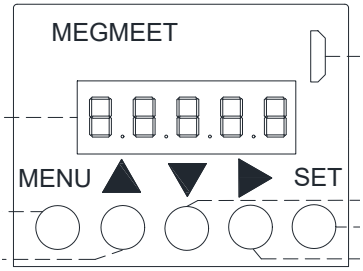


Fig. 4-1 Interface appearance

Interface key functions as shown in the table below:

Table 4-1 Interface key functions

Key	Key name	Function
MENU	Menu/exit key	In the working status display or monitor parameters menu, press this key to switch between the working status display or monitor parameters menu and level 1 menu of the parameter settings. In level 2 menu of the parameter setting, press this key to return to the previous menu.
▸	Switch/shift/page key	In the working status display menu, press this key to switch between the working status display and monitor parameters menu. In the parameter setting interface, press this key to left shift the selected blinking digits. When the parameter value is greater than 5 digits and can not be modified, pressing this key, you can scroll the display parameter values.
▲	Increase key	In the monitoring parameter menu, press this key to select the monitoring parameters. In the parameter setting interface, press this key to increase the current blinking digits setting value, long press to increase rapidly.

Key	Key name	Function
▼	Decrease key	In the monitoring parameter menu, press this key to select the monitoring parameters. In the parameter setting interface, press this key to decrease the current blinking digits setting value, long press to decrease rapidly.
SET	Enter/confirm/reset key	In the parameter setting interface, press this key to enter the next menu, or confirm the current parameter value and return to the previous menu. Under the fault status display, press this key to reset the fault.

4.2 Working status display

S6 servo drive can display the following several working status.

Table 4-2 Servo drive function status and display

LED display graphics	Symbol	Status description
rSt	"rst"	Power on initialization state, indicate that the system is at start or reset state.
nrd	"nrd"	Start or reset is completed, the servo is not yet ready.
rdy	"rdy"	Servo system self-detection normal, wait for the host to give a command signal.
run	"run"	Servo running status.
Er.XXX	"Er.xxx"	Servo fault status.
AL.XXX	"AL..xxx"	Servo alarm status.

4.3 Working status display and parameter setting flowchart

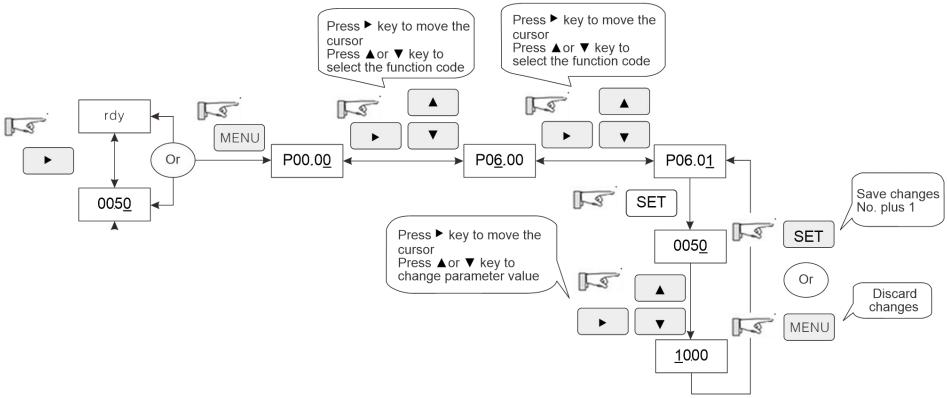


Fig. 4-2 Working status display and parameter setting flowchart

(1) After the servo drive power on initialization is completed, enter the working status display menu, if the servo system self-detection is normal, it will display "rdy".

(2) In the working status display menu, press ▸ key to switch between the working status display and monitor parameters menu.

(3) In the monitoring parameter menu, press▼/▲key to select the monitoring parameters.

(4) In the working status display or monitor parameters menu, press the MENU key to switch between the working status display or monitor parameters menu and level 1 menu of the parameter settings.

(5) In the parameter setting level 1 menu, press ▸ key to move the cursor to the parameter group or parameter serial number.

(6) In the parameter setting level 1 menu, press ▼/▲ key to select the required parameter group and parameter serial number.

(7) In the parameter setting level 1 menu, press the SET key to enter parameter setting level 2 menu to display the current value of the parameters. If at this time, the parameter values can be modified, its lowest digit will flash.

(8) In the parameter setting level 2 menu, press ▸ key to select the number of digits to be modified, press ▼/▲ key to increase or decrease the value.

(9) After the parameter are modified, if press the SET key to save the changes and return to the previous menu, if press the MENU key to discard the changes, and return to the previous menu.

4.4 Parameter value display

(1) Five-digit and below parameter values display

When the parameter value is in the [-9999 to 99999] , it can be displayed and edited in one page.

(2) Above five-digit parameter values display

When the parameter value exceeds [-9999 to 99999] , the parameter value need to turn the page to display and edit. The drive can display up to three page parameters, the following illustrates the page display logic. For example, to display -21474836.48, can be divided into [-21], [4748], [36.48] three pages, as shown in the figure below.

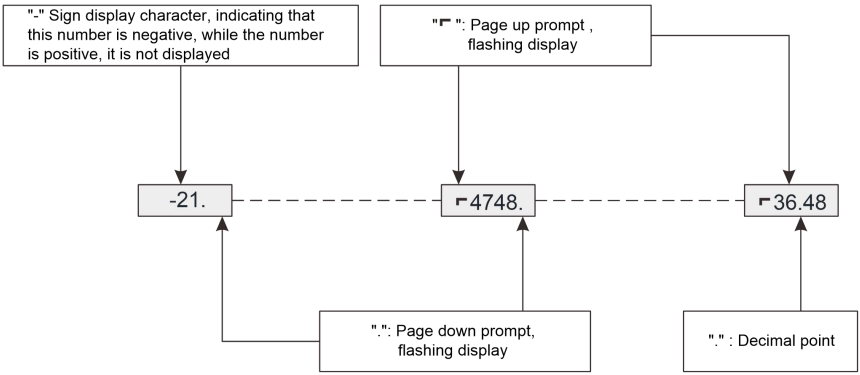


Fig. 4-3 Parameter page display logic

If the parameter value can be modified currently, press ▸ key to select the number of digits to be modified. If the parameter value can not be modified currently, at this time can only press ▸ key to scrolling display.

4.5 Commissioning

Power-on

Please check the following points carefully before the drive is powered on:

(1) Whether the power supply voltage is normal;

(2) Whether the main circuit wiring and control circuit wiring are normal;

If the power cable and drive L1, L2, L3 are three-phase 380V, L1C, L2C are single-phase 220V, whether the drive U, V, W and the motor terminals are firmly connected.

Commissioning parameter settings

After the drive is powered on, press the drive digital control panel buttons MENU / SET to enter the parameter function codes, such as P00. **. The basic parameters include motor control mode, motor parameters, encoder parameters, etc.

Function code	Name	Setting range	Default value	Change
P01.00	Motor and control mode selection	Unit place: Control mode selection of the motor 0: Reserved 1: Vector control with PG 2: V/F control without PG Tens place: Type selection of the motor	01	×

Function code	Name	Setting range	Default value	Change
		0: Asynchronous motor 1: Synchronous motor		
P02.00	Control mode selection	0: Speed mode 1: Position mode 2: Torque mode 3: Speed mode ← → position mode (9th function switching) 4: Torque mode ← → position mode (9th function switching) 5: Speed mode ← → torque mode (9th function switching) 6: Speed mode ← →torque mode ← → position mode (9th function switching torque, 10th function switching position, It does not switch when it is valid at the same time or invalid at the same time, and it remains in the speed mode) 7: CANopen mode 8: EtherCAT mode 9: M3 mode	0	×
P02.01	Internal servo enable	0~1	0	○
P06.00	Main reference source selection	0: Digital reference (P06.01) 1: AI1 analog reference 2: AI2 analog reference 3: Serial port communication reference 4: Multi-step speed reference (auxiliary reference is not supported) 5: Pulse input reference	0	○
P06.07	Speed command acceleration time 1	0~65535ms	6000	○
P06.08	Speed command deceleration time 1	0~65535ms	6000	○
P06.09	Maximum speed threshold	0~60000rpm	5000	○
P06.10	Forward speed threshold	0~60000rpm	5000	○
P06.11	Reverse speed threshold	0~60000rpm	5000	○
P01.01	Rated power	0.04~99.99kW	Depending on model	×

Function code	Name	Setting range	Default value	Change
P01.02	Rated voltage	0~9999V	380V	×
P01.03	Rated current	0.1~999.9A	Depending on model	×
P01.04	Rated torque	0.1~655.35N·m	Depending on model	×
P01.05	Maximum torque	0.1~655.35N·m	Depending on model	×
P01.06	Rated frequency	1.00~3000.00Hz	50.00	×
P01.07	Rated speed	0~60000rpm	1450rpm	×
P01.08	Maximum speed	0~60000rpm	9000rpm	×
P01.09	Rotor inertia Jm	0.1kg*cm2~6553.5kg*cm2	Depending on model	×
P01.10	Number of pole pairs	2~72 pairs of poles	2	×
P01.17	Encoder selection	0: Line-saving incremental encoder (ABZ) 1: Tamagawa serial intelligent 23-bit absolute encoder 2: SinCos encoder 3: BISS-C encoder	1	×
P01.18	Number of encoder lines	1~1073741824	2500	×
P01.19	Encoder installation initial angle tuning	0: Disabled 1: Enabled	0	×

Check PG wiring

Enter the encoder count value parameter P11.19, manually rotate the motor shaft, see whether the value has changed, if not, check the encoder wiring and parameter settings.

Parameter auto-tuning

Vector control are required to identify the motor parameters, in order to get the best control effect. When identification, make sure that the motor is in idling or light load condition. When auto-tuning set P01.19 = 1 to perform dynamic identification, the drive will self-identify stator resistance, leakage inductance, rotor resistance, mutual inductance and no-load current (induction motor) and other parameters, in the identification of the no-load current it will rotate at 60% of the motor rated speed, finally stop running automatically without an alarm, indicating that the auto-tuning is completed.

🕮 Note

The following conditions can cause auto-tuning failure, Er.018 error will be reported:

(1) Motor nameplate setting error, please re-set (if no motor nameplate or motor parameter uncertainty, please consult the motor manufacturer);

(2) Maximum speed threshold P06.09, forward speed threshold P06.10 are set too low, when tuning the value shall not be less than 60% of the motor rated frequency. If it is less than, it is necessary to increase the upper limit frequency and the maximum output frequency.

Servo internal reference commissioning

P01.00=01, P06.01=100, enable P02.01=1, observe whether the actual speed of P11.01 is normal, and the spindle stops running when P02.01=0 after the speed is normal.

Motor load inertia identification

Enter parameter P09.00, press and hold the ↑ key for 5s to start the load inertia moment ratio tuning (the motor will rotate during the tuning process, pay attention to safety). During the tuning process, wait for the value of P09.00 to stabilize and then release it. The current value displayed by P09.00 is the load inertia moment ratio after tuning, double-click the SET key to save the tuned parameter value, the tuning is completed, and P09.38 is the load inertia moment ratio after tuning, then the motor load inertia identification is completed.

Commissioning before host device control

After the motor identification is completed, the drive and the motor can be tested in speed mode in closed loop, P01.00=01, P06.01=100, and then enable P02.01=1, observe whether the actual speed of P11.01 is normal, and after the speed is normal test whether the motor runs normally at high and low speeds, such as the drive output current, whether the motor has vibration and large noise, etc.

After a simple commissioning is successful, you can connect the host device, control the drive and motor running through the host device.

🕮 Note

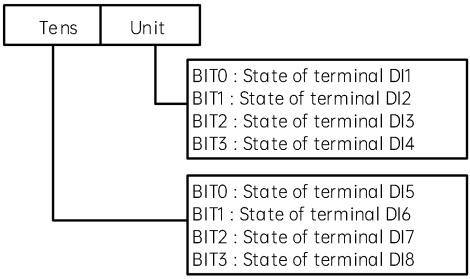
Determine whether the rotation direction of the asynchronous motor and the direction of the encoder are consistent:

Set P01.00 = 02, asynchronous motor is forward running in V / F mode, view the monitoring parameters P11.01. If it is negative, it indicates the opposite direction; if it is positive, it indicates the same direction.

Host device control problems that may occur and solutions:

(1) The drive has not received running command

View monitoring parameters P11.11, let the system send forward, reverse running signal, see whether the bit0 of P11.11 is 1; if not, check the drive and system I / O signals.



(2) The drive has not received analog signal.

Enter the analog monitoring parameters P11.13 (AI1 channel), P11.14 (AI2 channel), the monitor parameter displays the analog signals received by the drive before adjustment. Check whether the parameter and the analog command sent by the host device are same, if there is no value, check the wiring or check whether the host device has sent analog signal.

(3) The drive has not received pulse signal.

Receive pulse: Enter P11.17 to view the input pulse frequency, If it is zero, check whether the host device has sent pulse signal or check the wiring.

(4) Motor vibration

Determine that there is low speed vibration or high speed vibration, it may be appropriate to adjust the loop gain.

4.6 Speed mode

Speed command source

Function code	Name	Setting range	Default value	Change
P06.00	Main reference source selection	0: Digital reference (P06.01) 1: AI1 analog reference 2: AI2 analog reference 3: Serial port communication reference 4: Multi-step speed reference (auxiliary reference is not supported) 5: Pulse input reference	0	○

a. When the speed command source is AI analog, you can set the following parameters:

Function code	Name	Setting range	Value	Change
P06.00	Main reference source selection	0: Digital reference (P06.01) 1: AI1 analog reference 2: AI2 analog reference 3: Serial port communication reference 4: Multi-step speed reference (auxiliary	1	○

Function code	Name	Setting range	Value	Change
		reference is not supported) 5: Pulse input reference		

b. When the speed command source is pulse reference, you can set the following parameters:

Function code	Name	Setting range	Default value	Change
P05.03	Pulse command logic	0: Positive logic 1: Inverse logic	0	×
P05.05	Pulses for one motor revolution	0~8388608 P/r	2500	○

📖 **Note**

You can control the speed by setting P05.05, the greater the value, the lower the speed.

Positive and negative logic determines whether the speed is positive or negative.

Acceleration and deceleration time

Function code	Name	Setting range	Default value	Change
P06.07	Speed command acceleration time 1	0~65535ms	6000ms	○
P06.08	Speed command deceleration time 1	0~65535ms	6000ms	○

Specific acceleration and deceleration time is determined according to the needs of the device.

📖 **Note**

When you need device smooth acceleration and deceleration:

Should try to increase P06.07 (acceleration time 1) and P06.08(deceleration time 1).

When you need device rapid acceleration and deceleration:

Too small acceleration and deceleration time setting will cause acceleration overcurrent (Er.001), deceleration over voltage (Er.002) fault and requires appropriate resistor matching, and function code is set to open dynamic braking.

Loop gain adjustment

Function code	Name	Setting range	Default value	Change
P08.00	Speed loop proportional gain 1	0.1~3276.7	9	○

Function code	Name	Setting range	Default value	Change
P08.01	Speed loop integral time 1	0.0~1000.0ms	60	○
P08.02	Position loop gain 1	0.1~3000.0	11.5	○
P08.03	Speed regulator output filter time 1	0~32.00ms	3	○
P08.04	Speed loop proportional gain 2	0.1~3276.7	9	○
P08.05	Speed loop integral time 2	0.1~3000.0ms	60	○
P08.06	Position loop gain 2	1~8000	11.5	○
P08.07	Speed regulator output filter time 2	0~32.00ms	3	○
P08.08	Gain selection mode	0: The first gain is fixed, use external DI for P/PI switching 1: Use gain switching according to the condition of P08.09	0	○
P08.09	Gain switching condition selection	0: Gain 1 is not switched 1: Use external DI terminal switching 2: Torque command 3: Speed command 4: Feedback speed 5: Speed command change rate 6: Position deviation 7: Speed command high and low speed threshold 8: Position command 9: Positioning uncompleted 10: Position command + actual speed	0	○
P08.10	Gain switching delay time	0~1000ms	5	○
P08.11	Gain switching level	0~20000	50	○
P08.12	Gain switching hysteresis	0~20000	30	○
P08.13	Position gain switching time	0~1000ms	5	○

In the debugging process, the problem of PID parameter tuning is often encountered. Improper PID setting can cause system instability.

Set value	Gain switching condition	Detailed description
0	The first gain is fixed	Fixed first gain, no switching

Set value	Gain switching condition	Detailed description
1	Use external DI terminal switching	When the No. 3 terminal function (gain switching) is valid, switch to the second gain, otherwise it is the first gain
2	Torque command	Switch to the second gain when the absolute value of the torque command exceeds (level +delay) [%] at the previous first gain. Return to the first gain when the absolute value of the torque command is lower than (level-delay) [%] during the delay time period at the previous second gain
3	Speed command	Switch to the second gain when the absolute value of the speed command exceeds (level +delay) [r/min] at the previous first gain. Return to the first gain when the absolute value of the speed command is lower than (level-delay)[r/min] during the delay time period at the previous second gain
4	Feedback speed	Switch to the second gain when the absolute value of the speed feedback exceeds (level +delay) [r/min] at the previous first gain. Return to the first gain when the absolute value of the speed feedback is lower than (level-delay)[r/min] during the delay time period at the previous second gain
5	Speed command change rate	Switch to the second gain when the absolute value of the speed command change rate exceeds (level +delay)[10rpm/s] at the previous first gain. Return to the first gain when the absolute value of the speed command change rate is lower than (level-delay)[10rpm/s] during the delay time period at the previous second gain
6	Position deviation	Switch to the second gain when the absolute value of the position deviation exceeds (level +delay) [pulse] at the previous first gain. Return to the first gain when the absolute value of the position deviation is lower than (level-delay)[pulse] during the delay time period at the previous second gain
7	Speed command high and low speed threshold	At the previous first gain, when the absolute value of the speed command exceeds (level-delay) [r/min], it starts to switch to the second gain, the gain gradually changes, and when the absolute value of the speed command reaches (level + delay)) [r/min], the gain completely becomes the second gain. At the previous second gain, when the absolute value of the speed command exceeds (level+delay) [r/min], it starts to switch to the first gain, the gain gradually changes, and when the absolute value of the speed command reaches (level - delay)) [r/min], the gain completely becomes the first gain.
8	Position command	At the previous first gain, if the position command is not 0, switch to the second gain. At the previous second gain, if the position command is 0 during the delay time, it returns to the first gain.

Set value	Gain switching condition	Detailed description
9	Positioning uncompleted	At the previous first gain, if the positioning is not completed, switch to the second gain. At the previous second gain, if the positioning completed state continues for the delay time, return to the first gain.
10	Position command + actual speed	At the previous first gain, if the position command is not 0, switch to the second gain. In the previous second gain, if the position command is 0 during the delay time and the absolute value of the actual speed is less than (level-delay) [r/min], return to the first gain.

🕮 **Note**

Speed loop:

Increasing the proportional gain P can accelerate the dynamic response of the system, but if the P value is too large, it is easy to cause the oscillation of the system.

Decreasing the integral time I can accelerate the dynamic response of the system, but if the I value is too small, it is easy to cause the overshoot and oscillation of the system.

If the PI parameter is not selected properly, the over-voltage fault may occur after the system is started to reach the high speed quickly (if no external braking resistor or braking unit is connected), this is caused by the energy feedback produced in the system regenerative braking while decelerating after the overshoot, It can be avoided by adjusting the PI parameter.

4.7 Loop bandwidth settings

In order to simplify the debugging of speed loop and position loop, customers can adjust according to the rigidity table to simplify the debugging workload. The steps are as follows:

(1) Correctly set motor parameters (P01.01~P01.10), encoder parameters and complete parameter auto-tuning. Power off and on again.

(2) Set P09.06 to 1 (parameter self-adjustment mode, use the rigidity table to automatically adjust the gain parameters), manually press the keyboard to enter parameter P09.00, then the keyboard will display 0.00 (the drive will enter the run state), press the ▲ key , the motor will run forward and reverse to identify the system inertia, and the keyboard will display the identified system inertia ratio in real time. After the displayed system inertia ratio changes little, double-click the SET key, and the identified system inertia ratio will be written into P09.38, and exit the inertia identification state.

(3) By setting P09.07 to set the rigidity level, the drive automatically adjusts the gain of each loop to realize simple debugging.

🕮 Note

The moment of inertia of the motor (P01.09) may not be found on the nameplate or in the motor manual, and can be set according to the following empirical values:

1.5kw motor 40kg*cm^2 3.7kw motor 60kg*cm^2 5.5kw motor 75kg*cm^2

7.5kw motor 100kg*cm^2 11kw motor 140kg*cm^2 15kw motor 170kg*cm^2

When P09.06 is set to 1 (parameter self-adjustment mode, the gain parameters are automatically adjusted by the rigidity table), the change of the loop gain parameters of group P08 is invalid.

4.8 Position control

Position command source

Function code	Name	Setting range	Default value	Change
P05.00	Position reference mode	0: Pulse reference 1: Single point position reference 2: Multi-segment position reference	0	×
P05.01	Pulse command input terminal selection	0: Low-speed terminal 1: High-speed terminal	0	×
P05.02	Pulse command mode	0: A/B phase pulse 1: PLUS+SIGN 2: CW/CCW pulse	0	×

When the position command source is pulse reference, you can set the following parameters:

Function code	Name	Setting range	Default value	Change
P05.03	Pulse command logic	0: Positive logic 1: Inverse logic	0	×
P05.05	Pulses for one motor revolution	0~8388608 P/r	2500	×
P05.06	Position command first-order low-pass filter time	0.0~2000.0ms	13.1	○
P05.07	Position command moving average filter time	0.0~128.0ms	1.0	○

Electronic gear

Function code	Name	Setting range	Default value	Change
P05.08	Electronic gear molecular	1~1073741824	8388608	×
P05.09	Electronic gear denominator 1	1~1073741824	10000	×

Function code	Name	Setting range	Default value	Change
P05.10	Electronic gear denominator 2	1~1073741824	10000	×
P05.11	Electronic gear denominator 3	1~1073741824	10000	×
P05.12	Electronic gear denominator 4	1~1073741824	10000	×

Electronic gear setting method is as follows:

(1) When P05.05 = 0, the electronic gear ratio parameters (P05.08~P05.12) and the electronic gear ratio switching conditions are valid. When P05.05 ≠ 0, the electronic gear ratio = encoder resolution ÷ P05. 05.

(2) Pulse equivalent;

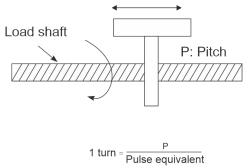
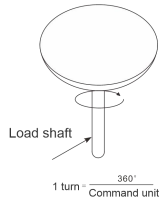
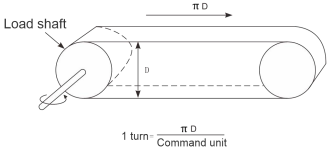
Pulse equivalent refers to the load minimum movement unit corresponding to each pulse command signal. Pulse equivalent can be 0.001mm, 0.1 °, 0.01 inches, a pulse is entered, moving a pulse equivalent of the distance or angle.

For example, pulse equivalent is 0.001mm, when the input command pulse is 50000, the amount of the load movement is (50000 * 0.001mm) = 50mm.

(3) Calculate the number of position command required by load shaft rotate a circle using the pulse equivalent

Displacement of the load shaft rotate a circle = Displacement for load shaft rotate a circle (command unit) * pulse equivalent.

For example, the ball screw pitch is 5mm, pulse equivalent is 0.001mm, then the displacement for load shaft rotate a circle (command unit) = 5mm / 0.001mm = 5000.

Ball screw	Round table	Belt pulley
		

(4) Calculate the electronic gear ratio

If the reduction ratio of the motor shaft and load shaft is m/n (ie the motor rotate m circle, load rotate n circle), then:

Electronic gear ratio =Electronic gear ratio numerator / Electronic gear ratio denominator = [(encoder pulses * 4) / the displacement for load shaft rotate a circle (command unit)] * (m / n)

4.9 Spindle positioning/homing

Function code:

Function code	Name	Setting range	Default value	Change
P12.00	Spindle indexing selection	0: Indexing disabled 1: Indexing enabled	0	○
P12.01	Homing mode	Origin detector types and looking for direction settings 0: Homing according to the current running direction, CCWL as a return to the origin 1: Homing according to the current running direction, CWL as a return to the origin 2: Forward homing, ORGP as a return to the origin 3: Reverse homing, ORGP as a return to the origin 4: The shortest distance homing, ORGP as a return to the origin 5: Homing according to the current running direction, ORGP as a return to the origin 6: Forward looking for Z pulse as a return to the origin 7: Reverse looking for Z pulse as a return to the origin 8: The shortest distance looking for Z pulse as a return to the origin 9: Homing according to the current direction, Z pulse as a return to the origin	9	○
P12.02	Homing command mode	0: Level mode 1: Pulse mode	0	○
P12.03	Origin correction mode	0: Single correction 1: Real-time correction	0	○
P12.04	Homing docking selection	0: Stop at the left side of the origin 1: Stop at the right side of the origin	0	○
P12.05	Encoder installation position	0: Mounted on the motor shaft 1: Mounted on the spindle	0	○
P12.07	Spindle transmission ratio	0.000~30.000	1.000	○
P12.08	Origin search speed	1~300rpm	10	×
P12.09	Origin position offset	0~360.000	180.000	○
P12.10	Reserved	0~1	0	○

Function code	Name	Setting range	Default value	Change
P12.11	Reserved	1~65535	5	○
P12.12	Indexing angle 1	0.000~359.999	0	○
P12.13	Indexing angle 2	0.000~359.999	0	○
P12.14	Indexing angle 3	0.000~359.999	0	○
P12.15	Indexing angle 4	0.000~359.999	0	○
P12.16	Indexing angle 5	0.000~359.999	0	○
P12.17	Indexing angle 6	0.000~359.999	0	○
P12.18	Indexing angle 7	0.000~359.999	0	○
P12.19	Indexing angle 8	0.000~359.999	0	○
P12.20	Indexing angle 9	0.000~359.999	0	○
P12.21	Indexing angle 10	0.000~359.999	0	○
P12.22	Indexing angle 11	0.000~359.999	0	○
P12.23	Indexing angle 12	0.000~359.999	0	○
P12.24	Indexing angle 13	0.000~359.999	0	○
P12.25	Indexing angle 14	0.000~359.999	0	○
P12.26	Indexing angle 15	0.000~359.999	0	○
P12.27	Indexing angle 16	0.000~359.999	0	○
P12.28	Positioning speed	0~2000rpm	500	○
P12.29	Positioning acceleration time	0.01~300.00s	2.00	○
P12.30	Positioning deceleration time	0.01~300.00s	2.00	○

🕮 Note

The origin of the spindle /positioning homing can select Z pulse of the spindle motor (electric spindle) or spindle proximity switches (non-electric spindle). If transmission ratio between the motor shaft and the spindle is 1:1, using the motor encoder Z pulse as home position switch. When DI3 (spindle /positioning homing) terminal function is set to 85, as long as the input signal is closed, the spindle perform accurate stop action, and after accurate stop in place will output DO1 (spindle positioning /homing completed). Spindle homing angle can rotate spindle position to the desired "zero" position when the spindle in the free state, it needs rotate more than two circles until P11.45 value has changed , then record P11.45 (spindle current angle) under this state , the value is set in the function parameters P12.09.

Spindle positioning/homing wiring diagram:

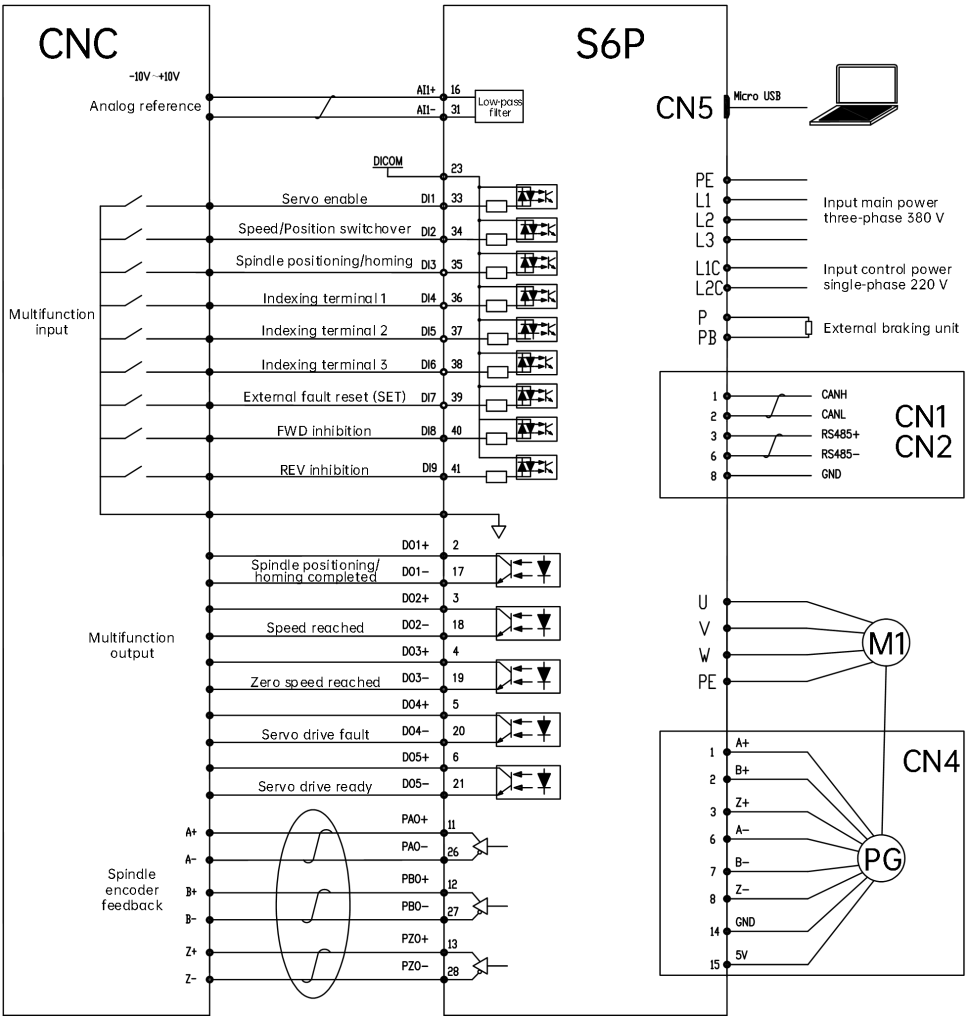


Fig. 4-4 Spindle positioning/homing wiring diagram

4.10 Rigid tapping

4.10.1 Analog for full process

Function code:

Function code	Name	Setting range	Default value	Change
P02.00	Control mode selection	0: Speed mode 1: Position mode 2: Torque mode 3: Speed mode ← → position mode (9th function switching) 4: Torque mode ← → position mode (9th function switching) 5: Speed mode ← → torque mode (9th function switching) 6: Speed mode ← →torque mode ← → position mode (9th function switching torque, 10th function switching position, It does not switch when it is valid at the same time or invalid at the same time, and it remains in the speed mode) 7: CANopen mode 8: EtherCAT mode 9: M3 mode	0	×
P06.00	Main reference source selection	0: Digital reference (P06.01) 1: AI1 analog reference 2: AI2 analog reference 3: Serial port communication reference 4: Multi-step speed reference (auxiliary reference is not supported) 5: Pulse input reference	1	○
P04.00	AI1 offset	-5000~5000	0	×
P04.01	AI1 filter	0.0~6000.0	20.0ms	×
P04.02	AI1 dead zone	0~1000.0	10.0mV	×
P04.03	AI1 zero drift	-1000.0~1000.0	0	×
P04.04	AI1 maximum reference	P04.10~100.00%	100.00%	○
P04.05	Actual value corresponds to AI1 maximum reference	Speed reference: 0.0~100.00% Smax Torque: 0.0~400.00%Te	100.00%	○
P04.06	AI1 inflection point 2 reference	P04.08~ P04.04	100.00%	○

Function code	Name	Setting range	Default value	Change
P04.07	Actual value corresponds to AI1 inflection point 2	The same as P04.05	100.00%	○
P04.08	AI1 inflection point 1 reference	P04.10~ P04.06	0.0%	○
P04.09	Actual value corresponds to AI1 inflection point 1	The same as P04.05	0.00%	○
P04.10	AI1 minimum reference	0.0%~P04.04	0.00%	○
P04.11	Actual value corresponds to AI1 minimum reference	The same as P04.05	0.00%	○

Full-process analog rigid tapping wiring diagram:

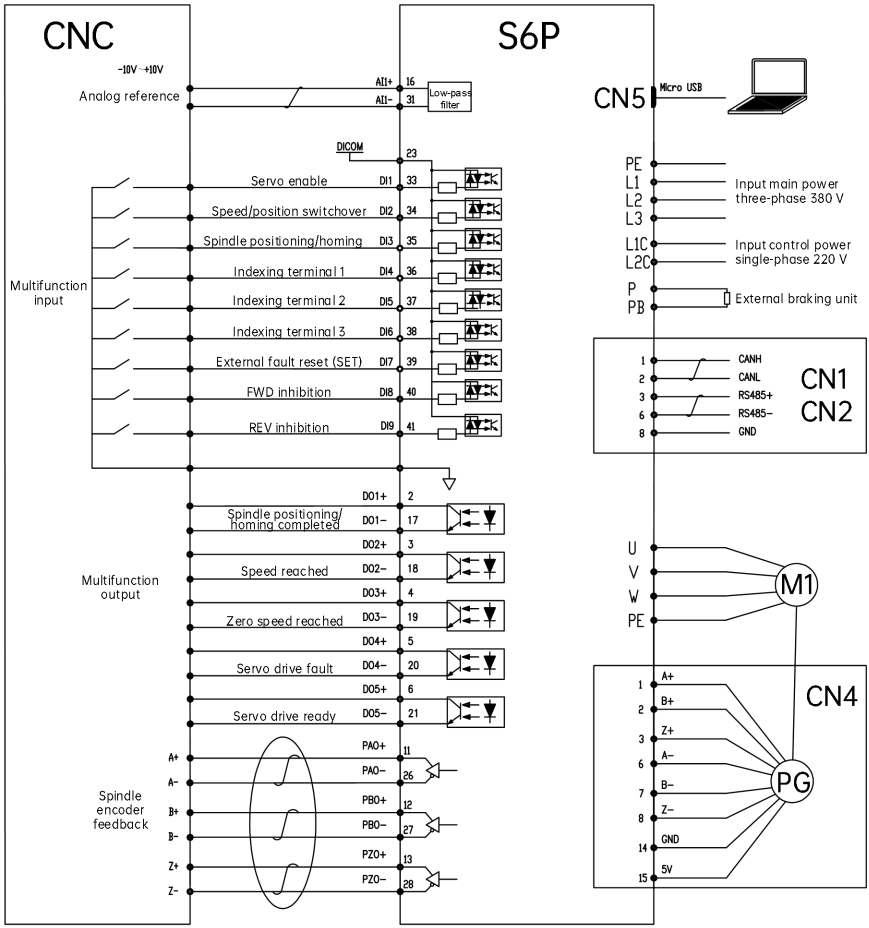


Fig. 4-5 Full-process analog rigid tapping wiring diagram

Note: In the figure the motor PG takes incremental encoder as an example, it also supports absolute encoder.

4.10.2 Pulse for full process

Function code:

Function code	Name	Setting range	Default value	Change
P02.00	Control mode selection	0: Speed mode 1: Position mode 2: Torque mode 3: Speed mode ← → position mode (9th function switching) 4: Torque mode ← → position mode (9th function switching) 5: Speed mode ← → torque mode (9th function switching) 6: Speed mode ← →torque mode ← → position mode (9th function switching torque, 10th function switching position, It does not switch when it is valid at the same time or invalid at the same time, and it remains in the speed mode) 7: CANopen mode 8: EtherCAT mode 9: M3 mode	3	×
P06.00	Main reference source selection	0: Digital reference (P06.01) 1: AI1 analog reference 2: AI2 analog reference 3: Serial port communication reference 4: Multi-step speed reference (auxiliary reference is not supported) 5: Pulse input reference	5	○
P03.02	DI 3 terminal function selection	9: Control mode switch 1	9	×
P05.00	Position reference mode	0: Pulse reference 1: Single point position reference 2: Multi-segment position reference	0	×
P05.01	Pulse command input terminal selection	0: Low-speed terminal 1: High-speed terminal	0	×
P05.02	Pulse command mode	0: A/B phase pulse 1: PLUS+SIGN 2: CW/CCW pulse	0	×
P05.03	Pulse command logic	0: Positive logic 1: Inverse logic	0	×

Function code	Name	Setting range	Default value	Change
P05.05	Pulses for one motor revolution	0~8388608 P/r	2500	×
P05.06	Position command first-order low-pass filter time	0.0~2000.0ms	13.1	○
P05.07	Position command moving average filter time	0.0~128.0ms	1.0	○

Note

When the pulse signal is used for speed control, the function code P06.00 (main reference source selection) is set to 5 (pulse input reference), you need to properly set the number of pulses per revolution of pulse reference P05.05 (pulses for one motor revolution) and P05.02 pulse command mode. In rigid tapping (pulse position control), the DI3 terminal function P03.02 is set to 9, when the DI2 terminal is valid, the spindle enter pulse reference position control mode.

Full-process pulse rigid tapping wiring diagram:

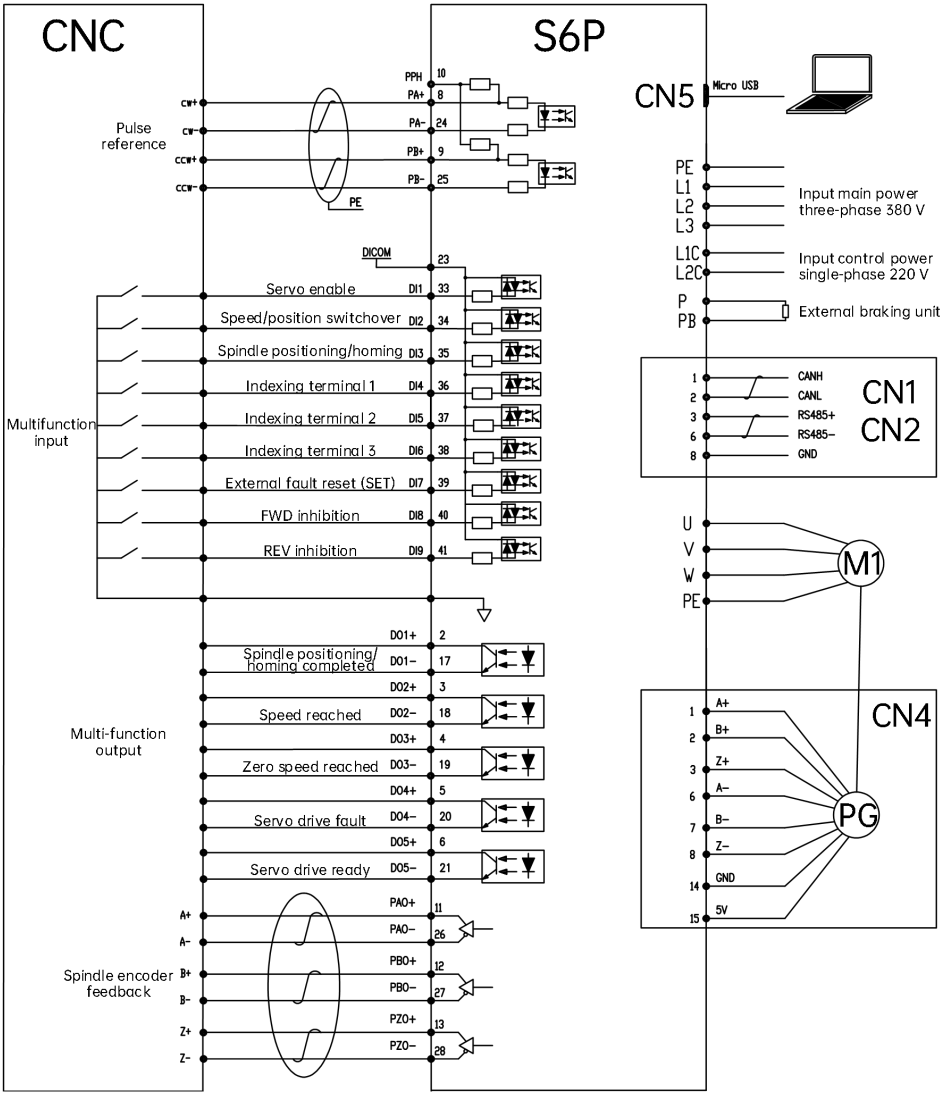


Fig. 4-6 Full-process pulse rigid tapping wiring diagram

Note: In the figure the motor PG takes incremental encoder as an example, it also supports absolute encoder.

4.11 Two-segment rigid gain adjustment in speed/position switchover mode

Function code	Name	Setting range	Default value	Change
P09.06	Gain adjustment mode	0: The parameter self-adjustment is invalid, and the parameter is adjusted manually 1: Parameter self-adjustment mode, use the rigidity table to automatically adjust the gain parameters 2: Positioning mode, use the rigidity table to automatically adjust the gain parameters	1	×
P09.07	Rigidity level	0~31	8	○
P20.04	Speed mode rigidity level in M3 bus mode	0~31 (setting 0 means not to switch the rigidity level in the speed mode, the rigidity level is P09.07)	0	×

Note: When the spindle needs to switch the speed and position, the spindle speed runs smoothly, and the rigidity in the position mode is strong, the single-stage rigidity table adjustment cannot meet the application requirements, at this time, we can use two-stage rigidity gain adjustment, speed loop gain and position loop gain use a separate rigidity table to adjust the loop rigidity accordingly. When P20.04=0, the speed loop gain and position loop gain are controlled by the rigidity level of P09.07. When P20.04 is non-zero (P20 .04 is the same rigidity level as P09.07). The two-stage rigidity adjustment is to ensure the shaft locking force of the spindle in the position mode and the speed fluctuation in the speed mode to be stable. P20.04 is the rigidity gain in the bit-speed mode, P09.07 is the rigidity gain in position mode.

Chapter 5 Troubleshooting

Displaying exception and solution

All possible fault types for S6 are summarized as shown in Table 5-1. The number of the fault code is 41. Before consulting the service department, the user can perform self-check according to the hints of the table and record the fault symptoms in detail. To seek for technical support, please contact the sales person.

Table 5-1 Fault record table

Fault code	Fault type	Fault cause	Confirming method	Solutions
Er.001	Drive overcurrent	The motor cables are in poor contact.	Check whether the cable connector is loose	Fasten the connector that become loose.
		The motor cables are grounded	Check the insulation resistance between the UVW and the grounding cable of the motor.	Replace the motor if the insulation is poor.
		The motor UVW cables are short circuited.	Check whether the motor UVW cables are short circuited.	Connect the motor cables correctly.
		The motor is damaged.	Check whether resistance between the motor cables UVW is balanced.	Replace the motor if the resistance is unbalanced.
		The gain setting is improper and the motor oscillates.	Check whether the motor oscillates or generates a shrill noise, or view the running graphics.	Re-adjust the gain.
		The encoder cable is incorrectly wired, corrosive, or connected loosely.	Check whether the encoder wiring is good and reliable.	Re-weld or fasten the encoder cable
Er.002	Drive main circuit overvoltage	The main circuit input voltage is too high.	Measure the input power line voltage range.	Adjust the power voltage according to the specification.
		The braking resistor fails.	Measure the resistance between P and PB.	If the resistor is open, replace the external braking resistor.
		External braking resistor value does not match (The resistance of the the external resistor is too large, and the energy	Confirm the braking resistor value.	Select the appropriate braking resistor value according to operating conditions and load.

Fault code	Fault type	Fault cause	Confirming method	Solutions
		absorption during braking is insufficient.)		
		The motor is in abrupt acceleration/deceleration state.	Confirm the deceleration ramp time during running and monitor the DC bus voltage P11.09.	Increase the acceleration/deceleration time in the allowed range.
Er.003	Drive control power overvoltage	The control supply voltage is higher than the input voltage range.	Measure the control power line voltage range.	Adjust the control supply voltage to within the product specification.
Er.004	Motor is blocked	The power output phase (UVW) loss or incorrect phase sequence occurs on the servo drive.	Perform motor trial running when the motor has no load and check the motor wiring.	Connect the motor cables correctly again or replace them.
		The UVW cable breaks.	Check the wiring.	Connect the motor cables correctly again or replace them.
		The motor rotor is locked due to mechanical factors.	Confirm the running command and motor speed.	Eliminate mechanical factors.
Er.005	Parameter modification failed	The parameter modification is effective only after power-off and power-on again.	Check the effective type of the parameter.	After parameter modification, power off and then power on the servo drive, and check whether the parameter modification is effective.
Er.006	Input side phase loss	There is phase loss in input L1, L2, L3.	Check input wiring; check input power.	If the input power is single-phase 220V, then P10.00=1; if the input power is three-phase 220V, check whether the input power is missing phase, and replace the cable wiring.
Er.007	Output side phase loss	There is phase loss in output U, V, W.	Check the output wiring Check the motor and the cables	Replace the cable wiring.
Er.008	Drive overheat	Ambient temperature is too high	Check the cooling conditions around the drive.	Improve the servo drive cooling conditions, reduce the ambient temperature.
		Multiple overload operation	Check fault records, whether overload fault	Waiting for 60s to reset after overload, increase the drive,

Fault code	Fault type	Fault cause	Confirming method	Solutions
			has been reported.	motor capacity, increase the acceleration and deceleration time, reduce the load.
		The fan is damaged.	Observe whether the fan is running while the drive is running.	Replace the fan
Er.009	Braking resistor overload	The cable of the external braking resistor is in poor connection, becomes loose or breaks.	Check the braking resistor wiring according to the correct wiring diagrams.	Rewire according to the correct wiring diagrams.
		The jumper across terminals P and PB is disconnected when the internal braking resistor is used.	Confirm the power terminal jumper wiring	Properly connect the jumper.
		The capacity of the servo drive or the braking resistor is insufficient.	Calculate the maximum braking energy	Improve braking resistor capacity or servo unit capacity, increase acceleration and deceleration time.
		The load inertia is too large.	Confirm the load inertia	Improve the drive, motor, resistor capacity.
Er.010	Power module protection	There is interphase short circuit or grounding short circuit in output three phases.	Check cable and output motor insulation.	Replace the cable or motor.
		Instantaneous over-current of the drive	See the over-current solutions	See the over-current solutions
		The auxiliary power supply is damaged; the drive voltage is insufficient.	Seek for technical support.	Seek for technical support.
		Inverter module bridging conduction	Seek for technical support.	Seek for technical support.
		Abnormal control board	Seek for technical support.	Seek for technical support.
		Braking pipe damaged	Seek for technical support.	Seek for technical support.
Er.011 Er.012	Er.011: Servo drive overload	Wiring of the motor and encoder is incorrect.	Check the wiring according to the	Rewire according to the correct wiring diagram,

Fault code	Fault type	Fault cause	Confirming method	Solutions
	Er.012: Motor overload		correct wiring diagram	replace the cable.
		The load is too heavy. The motor keeps output of effective torque higher than the rated torque for a long time.	Confirm the overload characteristic and operation instructions of the servo drive or servo motor.	Increase the drive, motor capacity, reduce the load, increase the acceleration and deceleration time.
		The acceleration/ deceleration is too frequent or the load inertia is too large.	View inertia ratio, confirm start-stop cycle	Increase the acceleration and deceleration time.
		The gain adjustment is inappropriate, the rigidity is too strong, the motor vibrates and the sound is abnormal	Observe whether the motor vibrates and generates noise during running.	Re-adjust the gain.
		The servo drive or motor model is set incorrectly.	View motor model settings	Set the correct model.
		The motor block occurs due to mechanical factors, resulting in very heavy load during running.	Check the running reference and the actual motor speed by using the drive debugging platform or the operation panel.	Eliminate mechanical factors.
		Note:You can clear the fault or re-power on the system 60s after occurrence of the overload fault.		
Er.013	EEPROM read/write fault	The read/write error of the control parameters occurs.	Confirm whether the instantaneous power failure occurs in the process of writing parameter.	After restoring the default parameter (P02.22), re-enter the parameters.
		Writing parameter times exceeds the maximum within a certain time.	Confirm whether the change of parameters is frequent from the host device.	Change the parameter writing method and write again.
Er.014	Abnormal serial port communication	Improper setting of communication parameters.	Confirm the function code setting.	Set the correct baud rate, communication data format, etc.
		The communication cable is wired incorrectly or unreliably connected, disconnected, etc.	Check whether the communication cable is correct and reliable.	Reconnect the communication cable, or replace the communication cable.

Fault code	Fault type	Fault cause	Confirming method	Solutions
		Improper setting of fault parameters.	Check whether the P15.02 setting is too short.	Set P15.02 correctly.
		The host device does not work.	Confirm the host system signal	Check whether the host device is working.
Er.015	External braking resistor is too small	The resistance of the external braking resistor is smaller than the minimum value required by the servo drive.	Measure the resistance and approval function code P02.20	It must be replaced to meet the requirements of the braking resistor, changing the function code P02.20.
Er.016	Current detection circuit abnormal	The wirings or the plug-in units of the control board loosens.	Check whether the control board cables and plug-in units are loose	Check them and rewiring
		The AI analog input voltage is too high.	Check whether the AI analog voltage input is above 12V	Adjust AI analog input.
Er.017	System interference	Internal communication interference	----------	Seek for technical support.
Er.018	Poor auto-tuning	The parameters of the motor are incorrect.	Confirm the motor nameplate parameters	Re-enter the correct motor parameters.
		When reverse running is prohibited, reverse rotating auto-tuning is performed.	Confirm whether it is set to prohibit reverse function.	Cancel the reverse running prohibition
		Motor wiring is wrong.	Check motor wiring.	Confirm that the UVW power cable is connected properly and the phase sequence is correct.
Er.019	First encoder fault	Encoder type error	Check encoder type	Enter the correct encoder parameters.
		Encoder disconnection	Check encoder cable	Replace encoder cable.
Er.020	Undervoltage during main circuit operation	Grid voltage drop	Measure whether the grid voltage is abnormal	Improve the power grid.
		The load is too large or the motor does not match the drive	Confirm the load matching conditions	Select the appropriate drive and motor.
Er.021	AI function conflict	The same AI is used for different functions.	Check the settings of the AI channel in the function parameters.	Confirm AI functions and avoid conflicts.
Er.022	The control mode	Parameter identification	Confirm the setting of the	Confirm the control mode

Fault code	Fault type	Fault cause	Confirming method	Solutions
	parameter setting is incorrect	is performed in non-VC control mode.	control mode in the parameter.	parameters.
Er.024	Abnormal AI analog input	The AI voltage is too high.	Measure AI channel input voltage	Reduce the AI voltage to less than 12V
		The AI wiring is incorrect	Check the AI wiring according to the correct wiring diagram.	Re-wiring.
Er.025	Temperature sampling disconnection	The temperature sampling circuit is abnormal.		Seek for technical support.
		The temperature sensor or signal cable is abnormal.		Seek for technical support.
Er.026	Second encoder fault	Encoder type error	Check encoder type	Enter the correct encoder parameters.
		Encoder disconnection	Check encoder cable	Replace encoder cable.
Er.027	Servo motor overspeed	The actual speed of the servo motor exceeds the overspeed threshold.	Confirm whether the overspeed threshold is appropriate (the overspeed threshold is set by P10.12, if P10.12 is equal to 0, the overspeed threshold is 1.2 times the maximum motor speed; if P10.12 is not equal to 0, the overspeed threshold is P10.12 and 1.2 times the maximum speed of the motor, whichever is smaller).	Set the correct overspeed threshold.
		The UVW phase sequence is incorrect.	Confirm the wiring of the servo motor	Check if there is a problem with the motor wiring.
		Input reference is higher than the overspeed level.	Confirm the input reference	Reduce the input reference, or adjust the gain.
		The motor speed overshoots.	Confirm the motor speed waveform	Reduce the controller gain, adjust the servo gain, or adjust the operating conditions.
		The servo drive is faulty.	Confirm whether the fault remains after the	Replace the servo drive.

Fault code	Fault type	Fault cause	Confirming method	Solutions
			drive is powered off and powered on again	
Er.028	Runaway	Motor UVW phase sequence wiring error	Check if there is a problem with the motor wiring	Wire according to the correct phase sequence and power on again
		The encoder wire is loose or disturbed	Whether the fault remains after the drive is powered off and powered on again	Check if there is any problem with the encoder cable.
Er.032	Position deviation is too large	The position deviation exceeds the set value of P05.21.	Check whether the position deviation detection range P05.21 is too small or whether the position gain P08.02 is too small.	Increase the position loop gain P08.02.
Er.034	Full closed loop position deviation is too large	The position deviation of the external encoder and the internal encoder is too large.	Confirm whether the numerator and denominator of the position proportional coefficient of the inner and outer loops are set correctly, and check whether the increase the full-closed loop position deviation excessive threshold P19.03 is too small. Whether the external encoder is disconnected.	Increase the full-closed loop position deviation excessive threshold P19.03. Check whether the wiring of the second encoder is broken.
Er.036	CAN bus communication connection interrupted	The communication between the CAN master station and the servo is interrupted for more than the time of P16.03.	Confirm the wiring between the CAN master and the servo.	Rewire or set the appropriate disconnection detection time P16.03 according to the communication cycle.
Er.037	Homing timeout	After the homing is enabled, the home is not found within the time of P12.09.	Confirm the homing mode and the homing timeout detection time P12.09.	Set an appropriate homing timeout detection time according to the homing path.
Er.039	Positive overtravel	When P10.04=0, it exceeds the positive limit switch during running.	Check whether mechanical equipment encounters limit switch.	Run the motor in reverse to get the device off the limit switch.

Fault code	Fault type	Fault cause	Confirming method	Solutions
Er.040	Negative overtravel	When P10.04=0, it exceeds the negative limit switch during running.	Check whether mechanical equipment encounters limit switch.	Run the motor in reverse to get the device off the limit switch.
Er.043	External fault	External fault terminal action.	Check whether the fault terminal is triggered by mistake.	Check external wiring.
Er.044	Contactor fault	The power-on buffer resistor or contactor is damaged.	----------	Seek for technical support.
Er.046	Output-to-ground short-circuit	The power output cables (UVW) of the servo drive are short circuited to ground.	Disconnect the UVW cables from the motor, and measure whether the motor UVW cables are short circuited to ground.	Connect the cables again or replace them.
		The motor is short circuited to ground.	Disconnect the UVW cables from the motor, and measure whether the motor UVW cables are short circuited to the motor grounding wire.	Replace the motor.
Er.047	Internal logic error	----------	----------	Seek for technical support.
Er.048	Short circuit of motor temperature detection	Short circuit of motor temperature detection	Check the wiring for motor temperature detection.	Check and rewire.
Er.049	Open circuit of motor temperature detection	Open circuit of motor temperature detection	Check the wiring for motor temperature detection.	Check and rewire.
Er.050	Motor coil delta connection error	The motor coil is not properly switched to the correct delta connection from Y connection, or the parameter setting is incorrect.	Check the solenoid valve function, related wiring and parameter settings.	Adjust the solenoid valve function, related wiring and parameter settings.
Er.051	Motor coil Y connection error	The motor coil is not properly switched to the correct Y connection	Check the solenoid valve function, related wiring and parameter settings.	Adjust the solenoid valve function, related wiring and parameter settings.

Fault code	Fault type	Fault cause	Confirming method	Solutions
		from delta connection, or the parameter setting is incorrect.		
Er.058	Speed deviation too large	The rigid setting is improper, or the detection threshold for speed deviation is too small.	Check the parameters.	Adjust the parameters.
Er.060	Reversed Z signal of the fully closed-loop second encoder	The Z signal of the second encoder is reversed.	Check the Z+/Z- wiring of the second encoder.	Reverse second encoder Z+/Z-.
Er.061	Electronic gear ratio error	The electronic gear ratio is set incorrectly.	Confirm whether the electronic gear ratio parameter setting is reasonable.	Correctly set the electronic gear ratio parameters.
Er.062	The Z signal of the rotary wave encoder is reversed	The Z signal of the rotary wave encoder is reversed	Verify that the Z+/Z- wiring is correct	Reverse Z+/Z-
Er.063	Fully closed-loop position deviation too large	Internal and external drive mechanism is inactive, or the encoder is damaged.	Check whether the second encoder is wired correctly or whether it is damaged.	Check the encoder, and troubleshoot the mechanical fault.
Er.064	6-pulse auto-tuning failed	Due to initial angle auto-tuning of synchronous motor upon power-on	Seek for technical support.	Seek for technical support.
Er.066	Control circuit undervoltage	The control circuit is powered down or under-voltage, only the USB is powered.	Check and measure whether the control circuit power supply voltage is within the normal range, and whether the control circuit power supply wiring is normal.	Check the power supply wiring and replace the control power supply.
Er.067	Motor overtemperature	The detected motor temperature exceeds the alarm threshold set by P10.13	Check whether the motor temperature detection wiring is normal, whether the setting of P10.13 is reasonable, and whether	Correct wiring and set P10.13 and P10.11 reasonably

Fault code	Fault type	Fault cause	Confirming method	Solutions
			the setting of the motor temperature detection resistance type P10.11 is correct.	
Er.068	Angle auto-tuning error	The load is too large upon angle auto-tuning of synchronous motor.	Check whether the motor shaft is stuck.	Troubleshoot the mechanical fault.
Er.069	Vibration too large	Vibration during motor running is too large.	Check the rigid setting and the inertia setting.	Check and adjust related parameters.
Er.070	Overtorque fault	Encoder direction is reversed	Check whether the rotation direction of the motor is consistent with the direction of the encoder	P01.20=1 redo motor auto-tuning
		Encoder parameter setting error	Check whether the encoder parameters are set correctly	Set the correct encoder parameters
		Motor parameter setting error	Check whether the motor parameters are set correctly	Set the correct motor parameters
		Inappropriate setting of loop gain parameters	Check whether the loop gain parameter is set properly	Set proper loop gain parameters
Er.072	DB overload	Braking resistor is overloaded.	Check whether the specifications of the braking resistor are proper.	Select a suitable braking resistor.
Er.073	Brake pipe short circuit	Overcurrent protection on the brake pipe	Check whether the braking resistor is short circuited.	Check the wiring of the braking resistor.
Er.074	Exceeding software limit	The motor runs over the software limit point.	Check the software limit parameter and actual motor running state.	Adjust the software limit parameter and actual motor running state.
Er.075	Virtual homing error	Seek for technical support.	Seek for technical support.	Seek for technical support.
Er.076	EtherCAT initialization error	ASIC communication is abnormal.	Restart the drive.	Restart the drive.
Er.079	Lack of EEPROM program	The EEPROM program of ASIC is not burned.	Seek for technical support.	Seek for technical support.

All the possible alarm types for S6 are summarized as shown in Table 5-2. For details, please refer to the group P97 function code setting. If the fault disappears automatically during the running process, the drive will also automatically reset to the status before the alarm (except AL.SC1, for details, please refer to the group P97 function code description).

Table 5-2 Alarm code table

Alarm code	Alarm type	Possible alarm causes	Solutions
AL.oL1	Servo drive overload	The motor parameters are incorrect.	Perform the parameter auto-tuning of the motor
		The load is too large.	Adopt the servo drive with higher power
		The DC braking amount is too large.	Reduce the DC braking current and lengthen the braking time
		When instantaneous stop happens, restart the rotating motor	Set the start mode P08.00 as the speed tracking restart function
		The acceleration time is too short.	Lengthen the acceleration time
		The grid voltage is too low.	Check the grid voltage
		V/F curve is improper.	Adjust V/F curve and torque increase
AL.oL2	Motor overload	The motor overload protection factor setting is incorrect.	Set the overload protection factor of motor correctly.
		The motor is blocked or the sudden change of load is too large.	Check the load
		The universal motor runs at low speed for a long time, with heavy load.	If long-term low-speed running is required, special motor should be used.
		The grid voltage is too low.	Check the grid voltage
		V/F curve is improper.	Set V/F curve and torque increase correctly
AL.EEP	EEPROM read/write fault	The read/write error of the control parameters occurs.	Reset by pressing the STOP/RESET key, or seek for technical support.
AL.SC1	Abnormal serial port communication	The baud rate is set improperly.	Set the baud rate properly.
		Serial port communication error	Reset by pressing the STOP/RESET key, or seek for technical support.
		The fault alarm parameters are set improperly.	Modify the P15.03 and P97.00 settings
		The host device does not work.	Check if the host device is working and if the wiring is correct.
AL.rLy1	Abnormal contactor	The grid voltage is too low.	Check the grid voltage
		The contactor is damaged.	Replace the contactor of the main circuit, or seek for technical support.
		The power-up buffer resistance is damaged.	Replace the buffer resistance, or seek for technical support.
		The control circuit is damaged.	Seek for technical support.

Alarm code	Alarm type	Possible alarm causes	Solutions
		Input phase loss	Check the input R.S.T. wiring
AL.EGL	External reference command lost	During the frequency main reference or the torque command selects analog current reference, the analog reference signal is disconnected or too low (less than 2mA).	Check the wiring or adjust the input type of the reference signal
AL.24v	Control board 24V power short circuit	Short circuit of 24V and terminal COM	Confirm whether the wiring of 24V and COM is correct
		The interface board circuit is damaged.	Replace the interface board, or seek for technical support.

WARNING

Please carefully choose the fault alarm function; otherwise, the accident range extension, the human injury and the property damage may be caused.

Chapter 6 Parameter List

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P00: Drive parameters							
P00.00	Serial No.	0~65535	1	Manufacturer setting	-	At display	PST
P00.01	DSP software version No.	0.00~99.99	0.01	Manufacturer setting	-	At display	PST
P00.02	User-customized version No.	0~9999	1	Manufacturer setting	-	At display	PST
P00.03	FPGA software version No.	0.00~99.99	0.01	Manufacturer setting	-	At display	PST
P00.04	Voltage class of servo drive	0: 220V 1: 380V	1V	Manufacturer setting	-	At display	PST
P00.05	Rated current of servo drive	0~999.9A	0.1A	Manufacturer setting	-	At display	PST
P00.06	Maximum current of servo drive	0~999.9A	0.1A	Manufacturer setting	-	At display	PST
P01: Motor parameters							
P01.00	Motor and control mode selection	Unit place: Control mode selection of the motor 0: Reserved 1: Vector control with PG 2: V/F control without PG Tens place: Type selection of the motor 0: Asynchronous motor 1: Synchronous motor	1	01	Immediate	At stop	PST
P01.01	Rated power	0.04~99.99kW	0.01	Depending on model	Power-on again	At stop	PST
P01.02	Rated voltage	0~9999V	1	380V	Power-on again	At stop	PST
P01.03	Rated current	0.1~999.9A	0.1A	Depending on model	Power-on again	At stop	PST
P01.04	Rated torque	0.1~655.35N·m	0.01 N·m	Depending on model	Power-on again	At stop	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P01.05	Maximum torque	0.1~655.35N·m	0.01 N·m	Depending on model	Power-on again	At stop	PST
P01.06	Rated frequency	1.00~3000.00Hz	0.01 Hz	50.00	Power-on again	At stop	PST
P01.07	Rated speed	0~60000rpm	1 rpm	1450rpm	Power-on again	At stop	PST
P01.08	Maximum speed	0~60000rpm	1 rpm	9000rpm	Power-on again	At stop	PST
P01.09	Rotor inertia Jm	0.1kg*cm^2~6553.5kg*cm^2	0.1 kg*cm^2	Depending on model	Power-on again	At stop	PST
P01.10	Number of pole pairs	2~72 pairs of poles	1	2	Power-on again	At stop	PST
P01.11	Stator resistance R1	0.001~65.000Ω	0.001Ω	Depending on model	Power-on again	At stop	PST
P01.12	Motor leakage inductance or direct axis inductance Ld	0.01~655.35mH	0.01mH	Depending on model	Power-on again	At stop	PST
P01.13	Motor mutual inductance or q-axis inductance Lq	0.01~655.35mH	0.01mH	Depending on model	Power-on again	At stop	PST
P01.14	Motor rotor resistance or back EMF constant	0.001~65.000 Ω (V/rpm)	0.001	Depending on model	Power-on again	At stop	PST
P01.15	Motor no-load current	0.1~999.9A	0. 1A	Depending on model	Power-on again	At stop	PST
P01.16	Synchronous motor type selection	0~1 0: SPM 1: IPM	1	0	Power-on again	At stop	PST
P01.17	Encoder selection	0: Line-saving incremental encoder (ABZ) 1: Tamagawa serial intelligent 23-bit absolute encoder 2: SinCos encoder 3: BISS-C encoder	1	1	Immediate	At stop	PST
P01.18	Number of	1~1073741824	1	2500	Immediate	At stop	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
	encoder lines						
P01.19	Encoder installation initial angle tuning	0: Disabled 1: Enabled	1	0	Immediate	At stop	PST
P01.20	Rotation direction	0: A before B 1: B before A	1	0	Immediate	At stop	PST
P01.21	Initial angle for installing encoder	0.0~359.9°	0.1°	180.0	Immediate	At stop	PST
P01.22	Initial angle of encoder Z pulse	0.0~359.9°	0.1°	180.0	Immediate	At stop	PST
P02: Basic control parameters							
P02.00	Control mode selection	0: Speed mode 1: Position mode 2: Torque mode 3: Speed mode ← → position mode (9th function switching) 4: Torque mode ← → position mode (9th function switching) 5: Speed mode ← → torque mode (9th function switching) 6: Speed mode ← →torque mode ← → position mode (9th function switching torque, 10th function switching position, It does not switch when it is valid at the same time or invalid at the same time, and it remains in the speed mode) 7: CANopen mode 8: EtherCAT mode 9: M3 mode		0	Immediate	At stop	PST
P02.01	Internal servo enable	0~1	1	0	Immediate	During running	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P02.02	Absolute value system mode selection	0: Absolute position linear mode 1: Absolute position rotation mode	1	0	Immediate	At stop	PST
P02.03	Rotation direction selection	0: Take the CCW direction as the forward direction (A before B) 1: Take the CW direction as the forward direction (reverse mode, B before A)	1	0	Immediate	During running	PST
P02.04	Encoder frequency-division output pulses	1~131072P/Rev	1	2500	Immediate	During running	PST
P02.05	Pulse output source selection	0: Motor encoder frequency-division output 1: Pulse command synchronous output 2: Frequency-division or synchronous output disabled	1	0	Immediate	During running	PST
P02.06	Output pulse direction selection	0: A before B 1: B before A	1	0	Immediate	During running	PST
P02.07	Z pulse output polarity selection	0: Positive output (Z pulse is high level) 1: Negative output (Z pulse is low level)	1	0	Immediate	During running	PST
P02.08	Stop mode	0: Decelerate to stop 1: Coast to stop	1	0	Immediate	During running	PST
P02.09	Emergency stop enable	0: No operation, keep the current running state 1: Enable emergency stop, stop according to the set stop mode (P02.08), and alarm AL.038	1	0	Immediate	During running	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P02.10	Delay from brake outputting ON signal to command received	20~500ms	1	250	Immediate	During running	PS
P02.11	Delay from brake outputting OFF signal to motor power-off in the standstill state	1~1000ms	1	150	Immediate	During running	PS
P02.12	Brake command output speed limit value	0~3000rpm	1	10	Immediate	During running	PS
P02.13	Servo OFF brake command waiting time	1~30000ms	1	500	Immediate	During running	PS
P02.14	Minimum energy consumption resistor allowed by drive	-	1	Depending on model	-	At display	PST
P02.15	Internal energy consumption resistor power	-	1	Depending on model	-	At display	PST
P02.16	Internal energy consumption resistor value	-	1	Depending on model	-	At display	PST
P02.17	Energy consumption braking usage rate	0: 0% 1: 25% 2: 50% 3: 75% 4: 100%	1	2	Immediate	During running	PST
P02.18	Fan control selection	0: Enable the fan according to temperature 1: Keep the fan always on 2: Enable the fan during running	1	0	Immediate	At stop	PST
P02.19	External energy consumption	1~65535W	1	Depending on model	Immediate	At stop	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
	resistor power						
P02.20	External energy consumption resistor value	1~65535Ω	1	Depending on model	Immediate	At stop	PST
P02.21	Parameter protection setting	0: All the data can be changed; 1: Only P06.01 and this function code can be changed 2: Only this function code can be changed	1	0	Immediate	During running	PST
P02.22	Parameter initialization	0: Parameter changing status 1: Clear fault memory information 2: Restore to leave-factory value	1	0	Immediate	At stop	PST
P02.23	LED display parameter selection	0: Switching display P11.00 1: Switching display P11.01 2: Switching display P11.02 3: Switching display P11.03 4: Switching display P11.04 5: Switching display P11.05 ... 5: Switching display P11.43	1	0	Immediate	During running	PST
P03: Digital input and output terminal parameters							
P03.00	DI1 terminal function selection	0: No function 1: Servo enable 2: Reserved 3: External jog forward running control input 4: External jog reverse	1	1	Immediate	At stop	PST
P03.01	DI2 terminal function selection		1	89	Immediate	At stop	PST
P03.02	DI3 terminal function selection		1	85	Immediate	At stop	PST
P03.03	DI4 terminal		1	86	Immediate	At stop	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
	function selection	running control input 5~9: Reserved 10: Acceleration/ deceleration time terminal 1 11: Acceleration/ deceleration time terminal 2 12,13: Reserved 14: Frequency increase command (UP) 15: Frequency decrease command (DN) 16: External fault normally open input 17: External fault normally closed input 18: External interrupt normally open contact input 19: External interrupt normally closed contact input 20: Reference frequency source switching command 21: Reserved 22: External reset (SET) input 23: Coast to stop input (FRS) 24:Acceleration /Deceleration inhibition 25: Stop DC braking input command 26~33: Reserved 34: Main reference frequency source					
P03.04	DI5 terminal function selection		1	87	Immediate	At stop	PST
P03.05	DI6 terminal function selection		1	88	Immediate	At stop	PST
P03.06	DI7 terminal function selection		1	22	Immediate	At stop	PST
P03.07	DI8 terminal function selection		1	41	Immediate	At stop	PST
P03.08	DI9 terminal function selection		1	42	Immediate	At stop	PST
P03.09	Reserved						

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		selection 1 35: Main reference frequency source selection 2 36: Main reference frequency source selection 3 37: Switching main reference frequency to AI 38: Command source selection 1 39: Command source selection 2 40: Switching command to terminal 41: FWD inhibition 42: REV inhibition 43: Servo drive running inhibition 44: External stop command (it is valid for all the control modes, the device will be stopped in accordance with the current stop mode) 45: Auxiliary reference frequency reset 46: Pre-magnetizing command terminal (Reserved) 47: Speed control and torque control switching terminal 48: Torque direction switching terminal for torque control 49~53: Reserved 54: Zero servo enable					

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		terminal 55: Motor 1 and 2 switching terminal 56: Reserved 57: Spindle swing 58,59: Reserved 60: Emergency stop 64~71: Reserved 72: Reaming enable 73~75: Reserved 76: Start positioning terminals 1 77: Start positioning terminals 2 78: Start positioning terminals 3 79, 80: Reserved 81: Position deviation counter reset 82:Command pulse inhibit 83: Position loop gain switching terminal 84: Position reference point input terminal (valid only for X6,X7,X8) 85: Spindle positioning /homing terminal 86:Spindle indexing terminal 1 87:Spindle indexing terminal 2 88:Spindle indexing terminal 3 89: Speed/Position switchover terminal 90: Tapping enable 91:Negative limit switch (valid only for X6,X7,X8)					

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		92:Positive limit switch (valid only for X6,X7,X8) 93~94: Reserved 95: Internal positioning start enable					
P03.10	DI1~DI8 terminal filtering time	0~500ms	1	10	Immediate	During running	PST
P03.11	DI9 terminal filtering time	0~255	25ns	80	Immediate	During running	PST
P03.12	Reserved						
P03.13	Input terminal enabled status	Binary setting: 0: Normal logical, enabled upon connection 1: Inverted logical, enabled upon disconnection Unit place of LED: BIT0~BIT3: DI1~DI4 Tens place of LED: BIT0~BIT3: DI5~DI8 Hundreds place of LED: BIT0: DI9	1	000	Immediate	During running	PST
P03.14	Virtual input terminal setting	Binary setting: 0: Disabled 1: Enabled Unit place of LED: BIT0~BIT3: DI1~DI4 Tens place of LED: BIT0~BIT3: DI5~DI8 Hundreds place of LED: BIT0: DI9	1	000	Immediate	During running	PST
P03.15	DO1 function selection	0: Drive in running state signal (RUN) 1: Frequency arrival signal (FAR)	1	30	Immediate	At stop	PST
P03.16	DO2 function selection		1	1	Immediate	At stop	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P03.17	DO3 function selection	2: Speed non-zero detection signal 3: Frequency level detection signal (FDT1) 4: Frequency level detection signal (FDT2) 5: Overload detection signal (OL) 6: Lockout for under-voltage (LU) 7: External fault stop (EXT) 8: Frequency upper limit (FHL) 9: Frequency lower limit (FLL) 10: Drive running at zero-speed 11:Zero speed reached 12: Reserved 13: Reserved 14: Reserved 15: Servo drive ready for running (RDY) 16: Servo drive fault 17: Host device switch signal 18: Reserved 19: Limiting torque Torque command is enabled when limited by the torque limit value 1 or 2 20: Flux detection signal Flux detection value is enabled when exceeding P09.33	1	11	Immediate	At stop	PST
P03.18	DO4 function selection		1	16	Immediate	At stop	PST
P03.19	DO5 function selection		1	15	Immediate	At stop	PST
P03.20	Reserved						

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		21: Zero servo completed 22: Analog torque offset enabled 23: Over-torque output 24: Under-torque output 25: Positioning completed 26: Positioning close to 27: Reserved 28: Position tolerance alarm 29: Reserved 30: Spindle positioning/ homing completed 31: Spindle indexing completed 32: Reserved 33: Reserved 34: Drive FWD/REV indication terminal 35: Motor 1 and 2 indication terminal 36: Communication card ON/OFF signal 37: Position 1 reached 38: Position 2 reached 39: Position 3 reached 40: Position 4 reached 41: Position 5 reached 42: Position 6 reached 43: Position 7 reached 44: Position 8 reached Only the following function No. will be shown in the shortcut menu: 0, 1, 3, 4, 5, 6,					

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		7, 8, 9, 15, 16					
P03.21	Output terminal enabled status setting	Binary setting 0: Enabled upon connection 1: Enabled upon disconnection Unit place of LED: BIT0~BIT3: DO1~DO4 Tens place of LED: BIT0: DO5	1	00	Immediate	During running	PST
P04: Analog input and output terminal parameters							
P04.00	AI1 offset	-5000~5000	1mV	0	Immediate	At stop	SST
P04.01	AI1 filter	0.0~6000.0	0.1ms	20.0ms	Immediate	At stop	ST
P04.02	AI1 dead zone	0~1000.0	0.1mV	10.0mV	Immediate	At stop	ST
P04.03	AI1 zero drift	-1000.0~1000.0	0.1mV	0.0mV	Immediate	At stop	ST
P04.04	AI1 maximum reference	P04.10~100.00%	0.1%	100.00%	Immediate	During running	ST
P04.05	Actual value corresponds to AI1 maximum reference	Speed reference: 0.0~100.00% Smax Torque: 0.00~400.00%Te	0.1%	100.00%	Immediate	During running	ST
P04.06	AI1 inflection point 2 reference	P04.08~ P04.04	0.1%	100.00%	Immediate	During running	ST
P04.07	Actual value corresponds to AI1 inflection point 2	The same as P04.05	0.1%	100.00%	Immediate	During running	ST
P04.08	AI1 inflection point 1 reference	P04.10~ P04.06	0.1%	0.0%	Immediate	During running	ST
P04.09	Actual value corresponds to AI1 inflection point 1	The same as P04.05	0.1%	0.00%	Immediate	During running	PST
P04.10	AI1 minimum reference	0.0%~P04.04	0.1%	0.00%	Immediate	During running	ST
P04.11	Actual value corresponds to AI1 minimum reference	The same as P04.05	0.1%	0.00%	Immediate	During running	ST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P04.12	AI2 offset	-5000~5000	1mV	0	Immediate	At stop	ST
P04.13	AI2 filter	0.0~6000.0	0.1ms	20.0ms	Immediate	At stop	ST
P04.14	AI2 dead zone	0~1000.0	0.1mV	10.0mV	Immediate	At stop	ST
P04.15	AI2 zero drift	-1000.0~1000.0	0.1mV	0	Immediate	At stop	ST
P04.16	AI2 maximum reference	P04.22~100.00%	0.01%	100.00%	Immediate	During running	ST
P04.17	Actual value corresponds to AI2 maximum reference	Speed reference: 0.0~100.00% Smax Torque: 0.0~400.00%Te	0.01%	100.00%	Immediate	During running	ST
P04.18	AI2 inflection point 2 reference	P04.20~ P04.16	0.01%	100.00%	Immediate	During running	ST
P04.19	Actual value corresponds to AI2 inflection point 2	The same as P04.17	0.01%	100.00%	Immediate	During running	ST
P04.20	AI2 inflection point 1 reference	P04.22~ P04.18	0.01%	0.00%	Immediate	During running	ST
P04.21	Actual value corresponds to AI2 inflection point 1	The same as P04.17	0.01%	0.00%	Immediate	During running	ST
P04.22	AI2 minimum reference	0.0%~P04.16	0.01%	0.00%	Immediate	During running	ST
P04.23	Actual value corresponds to AI2 minimum reference	The same as P04.17	0.01%	0.00%	Immediate	During running	ST
P04.24~ P04.29	Reserved						
P05: Position control parameters							
P05.00	Position reference mode	0: Pulse reference 1: Single point position reference 2: Multi-segment position reference	1	0	Immediate	At stop	P
P05.01	Pulse command input terminal selection	0: Low-speed terminal 1: High-speed terminal	1	0	Immediate	At stop	P

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P05.02	Pulse command mode	0: A/B phase pulse 1: PLUS+SIGN 2: CW/CCW pulse	1	0	Immediate	At stop	P
P05.03	Pulse command logic	0: Positive logic 1: Inverse logic	1	0	Immediate	At stop	P
P05.04	Reserved						
P05.05	Pulses for one motor revolution	0~8388608 P/r	1 P/r	2500	Immediate	At stop	P
P05.06	Position command first-order low-pass filter time	0.0~2000.0ms	0.1	13.1	Immediate	During running	P
P05.07	Position command moving average filter time	0.0~128.0ms	0.1ms	1.0	Immediate	During running	P
P05.08	Electronic gear ratio numerator	1~1073741824	1	8388608	Immediate	At stop	P
P05.09	Electronic gear ratio denominator 1	1~1073741824	1	10000	Immediate	At stop	P
P05.10	Electronic gear ratio denominator 2	1~1073741824	1	10000	Immediate	At stop	P
P05.11	Electronic gear ratio denominator 3	1~1073741824	1	10000	Immediate	At stop	P
P05.12	Electronic gear ratio denominator 4	1~1073741824	1	10000	Immediate	At stop	P
P05.13	Electronic gear ratio switching conditions	0: Position command is 0, switch after 3ms duration 1: Real-time switching	1	0	Immediate	At stop	P
P05.14	Position deviation clearing method selection	0: Clear position deviation when servo enable is OFF or stopped	1	00	Immediate	At stop	P

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		1: Clear position deviation when the servo enable is OFF or a fault/alarm occurs 2: Clear position deviation when the servo enable is OFF or the external position deviation clear DI is valid					
P05.15	Position deviation clear DI signal type	0: Pulse mode 1: Level mode	0	0	Immediate	At stop	P
P05.16	Speed feedforward control selection	0: No speed feedforward 1: Internal speed feedforward (take the speed information corresponding to the position command of the encoder unit as the source of the speed feedforward signal) 2: AI1 3: AI2	1	1	Immediate	At stop	P
P05.17	Position controller output limiter	0~100.0% maximum speed	0.1%	100%	Immediate	During running	PP
P05.18	Positioning complete output condition	0: Position deviation absolute value smaller than amplitude of positioning completed 1: Position deviation absolute value smaller than amplitude of positioning completed and position reference after filter	1	0	Immediate	At stop	PP

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		being 0 2: Position deviation absolute value smaller than amplitude of positioning completed and position reference being 0					
P05.19	Position positioning completed range	0~10000	1 command unit	10	Immediate	During running	PP
P05.20	Position close to signal width	1~32767	1 command unit	100	Immediate	During running	PP
P05.21	Position error detection range	0~107374180.5	1 encoder unit	23860929	Immediate	During running	PP
P05.22	Position error alarm selection	0: Valid 1: Invalid	1	0	Immediate	During running	PP
P05.23	Servo shutdown mode	0: Switch to servo speed control according to the downtime 1: Switch to the speed control deceleration stop	1	1	Immediate	During running	PP
P05.24	Servo downtime	0~3000ms When the PL (CCWL), NL (CWL) occurs, according to the time to slow down	1	100	Immediate	During running	PP
P05.25	Absolute position rotation mode mechanical gear ratio numerator	1~65535	1	1	Immediate	At stop	PP
P05.26	Absolute position rotation mode mechanical gear ratio denominator	1~65535	1	1	Immediate	At stop	PP

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P05.27	Absolute position linear mode position offset (lower 32 bits)	0~4294967295	1 encoder unit	0	Immediate	At stop	PP
P05.28	Absolute position linear mode position offset (upper 32 bits)	0~4294967295	1 encoder unit	0	Immediate	At stop	PP
P05.29	The number of pulses for one revolution of the load in absolute position rotation mode (lower 32 bits)	0~4294967295	1 encoder unit	0	Immediate	At stop	PP
P05.30	The number of pulses for one revolution of the load in absolute position rotation mode (upper 32 bits)	0~127	1 encoder unit	0	Immediate	At stop	PP
P05.31	Soft limit function setting	0: Disable soft limit 1: Enable software limit immediately after power-on 2: Enable soft limit after homing	1	0	Immediate	At stop	PP
P05.32	Software limit maximum point	-2147483648~2147483647	1 command unit	2147483647	Immediate	At stop	PP
P05.33	Software limit minimum point	-2147483648~2147483647	1 command unit	-2147483648	Immediate	At stop	PP
P06: Speed control parameters							
P06.00	Main reference source selection	0: Digital reference (P06.01) 1: AI1 analog reference 2: AI2 analog	1	0	Immediate	During running	SS

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		reference 3: Serial port communication reference 4: Multi-step speed reference (auxiliary reference is not supported) 5: Pulse input reference					
P06.01	Main reference speed setting	-60000~60000rpm	1rpm	500	Immediate	During running	SS
P06.02	Auxiliary speed source selection	0: No auxiliary reference 1: Digital reference 2: AI1 analog reference 3: AI2 analog reference 4: Serial port communication reference	1	0	Immediate	During running	SS
P06.03	Auxiliary reference speed setting	-60000~60000rpm	1rpm	0	Immediate	During running	SS
P06.04	Main/auxiliary reference calculation	0: + 1: - 2: Terminal switching main and auxiliary reference 3: MAX (main reference, auxiliary reference) 4: MIN (main reference, auxiliary reference)	1	0	Immediate	During running	SS
P06.05	Jog speed	-60000rpm~60000 rpm	1rpm	100rpm	Immediate	At stop	SS
P06.06	Jog operation	-60000rpm~60000 rpm	1rpm	0rpm	Immediate	At stop	SS

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P06.07	Speed command acceleration time 1	0~65535ms	1ms	6000	Immediate	During running	SS
P06.08	Speed command deceleration time 1	0~65535ms	1ms	6000	Immediate	During running	SS
P06.09	Maximum speed threshold	0~9000rpm	1rpm	5000	Immediate	During running	SS
P06.10	Forward speed threshold	0~9000rpm	1rpm	5000	Immediate	During running	SS
P06.11	Reverse speed threshold	0~9000rpm	1rpm	5000	Immediate	During running	SS
P06.12	Electric torque limit channel	0: Internal electric torque limit value 1: AI1 reference 2: AI2 reference 3: External electric torque limit value	1	0	Immediate	At stop	PST
P06.13	Braking torque limit channel	0: Internal braking torque limit value 1: AI1 reference 2: AI2 reference 3: External braking torque limit value	1	0	Immediate	At stop	PST
P06.14	Internal electric torque limit value	0.0%~+400.0%	0.1%	335.1%	Immediate	During running	PST
P06.15	Internal braking torque limit value	0.0%~+400.0%	0.1%	335.1%	Immediate	During running	PST
P06.16	External electric torque limit value	0.0%~+400.0%	0.1%	100%	Immediate	During running	PST
P06.17	External braking torque limit value	0.0%~+400.0%	0.1%	100%	Immediate	During running	PST
P06.18	Torque feedforward control selection	0: No torque feedforward 1: Internal torque feedforward (Use the speed command as the source of the torque feedforward signal.	1	1	Immediate	During running	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		In position control mode, the speed command comes from the output of the position controller.)					
P06.19	Zero clamp function	0: Disabled 1: Always enabled 2: Enabled under conditions (terminal enabled)	1	0	Immediate	At stop	S
P06.20	Zero clamp gain	0~6.000	0.001	1.000	Immediate	During running	S
P06.21	Zero clamp starting speed	0~1000rpm	1	2	Immediate	During running	S
P06.22	Speed reached detection width	0~5000rpm	1	20rpm	Immediate	During running	PST
P06.23	Zero speed threshold	0.0%~100.0% maximum speed	1.0%	1.0%	Immediate	During running	SS
P06.24	Speed consistency threshold	0~100rpm	1	10rpm	Immediate	During running	SS
P07: Torque control parameters							
P07.00	Torque reference selection	0: Digital reference 1: AI1 reference 2: AI2 reference 3: Serial communication reference	1	0	Immediate	At stop	T
P07.01	Torque positive direction selection	0: Forward drive is positive 1: Reverse drive is positive	1	0	Immediate	At stop	T
P07.02	Speed/torque switching mode selection	0: Switching directly 1: Switching once over the torque switching point	1	0	Immediate	At stop	T
P07.03	Torque digital reference value	-400.0%~400.0%	0.1%	0.0%	Immediate	During running	T
P07.04	Torque reference	0~655.35ms	0.01ms	0	Immediate	At stop	T

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
	first-order low-pass filter time						
P07.05	Torque reference second-order low-pass filter cutoff frequency	100~5000Hz	1Hz	5000	Immediate	At stop	T
P07.06	Torque reference second-order low-pass filter Q value	0.50~1.00	0.01	1.00	Immediate	At stop	T
P07.07	Speed/torque switching point	0%~+400.0% initial torque	0.1%	100.0%	Immediate	At stop	ST
P07.08	Speed/torque switching delay	0~1000.0ms	0.1ms	0	Immediate	At stop	ST
P07.09	FWD speed limit channel	0: FWD speed limit value 1: AI1 reference 2: AI2 reference	1	0	Immediate	At stop	T
P07.10	FWD speed limit value	0.0%~+100.0%	0.1%	100.0%	Immediate	During running	T
P07.11	REV speed limit channel	0: REV speed limit value 1: AI1 reference 2: AI2 reference	1	0	Immediate	At stop	T
P07.12	REV speed limit value	0.0%~+100.0%	0.1%	100.0%	Immediate	During running	T
P07.13	Torque reached reference value	0.0~400.0%	0.1%	0.0	Immediate	During running	T
P07.14	Over-torque threshold	0.0~400.0%	0.1%	150%	Immediate	During running	T
P07.15	Over-torque detection time	0.0~10.0	0.1s	3	Immediate	During running	T
P08: Gain parameters							
P08.00	Speed loop proportional gain 1	0.1~3276.7	0.1 Hz	9	Immediate	During running	PS
P08.01	Speed loop integral time 1	0.0~1000.0ms	0.1ms	60	Immediate	During running	PS
P08.02	Position loop gain	0.1~3000.0	1rad/s	11.5	Immediate	During	P

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
	1					running	
P08.03	Speed regulator output filter time 1	0~32.00ms	0.01ms	3	Immediate	During running	PS
P08.04	Speed loop proportional gain 2	0.1~3276.7	0.1 Hz	9	Immediate	During running	PS
P08.05	Speed loop integral time 2	0.1~3000.0ms	0.01ms	60	Immediate	During running	PS
P08.06	Position loop gain 2	1~8000	1rad/s	11.5	Immediate	During running	P
P08.07	Speed regulator output filter time 2	0~32.00ms	0.01ms	3	Immediate	During running	PS
P08.08	Gain selection mode	0: The first gain is fixed, use external DI for P/PI switching 1: Use gain switching according to the condition of P08.09	0	0	Immediate	During running	PS
P08.09	Gain switching condition selection	0: Gain 1 is not switched 1: Use external DI terminal switching 2: Torque command 3: Speed command 4: Feedback speed 5: Speed command change rate 6: Position deviation 7: Speed command high and low speed threshold 8: Position command 9: Positioning uncompleted 10: Position command + actual speed	1	0	Immediate	During running	PS
P08.10	Gain switching delay time	0~1000ms	1ms	5	Immediate	During running	S

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P08.11	Gain switching level	0～20000	Switching according to conditions	50	Immediate	During running	PS
P08.12	Gain switching hysteresis	0～20000	Switching according to conditions	30	Immediate	During running	PS
P08.13	Position gain switching time	0~1000ms	1ms	5	Immediate	During running	P
P08.14	Speed feedforward filter time	0.00~64.00ms	0.01	0.00	Immediate	During running	P
P08.15	Speed feedforward gain	0.0~100.0%	0.01%	100.0%	Immediate	During running	P
P08.16	Torque feedforward filter time	0.00~64.00ms	0.01	0.00	Immediate	During running	PS
P08.17	Torque feedforward gain	0.0~200.0%	0.1%	100.0%	Immediate	During running	PS
P08.18	Feedback speed low-pass filter time	0.00~4.00ms	0.01	0	Immediate	During running	PS
P08.19	PDFF	0.0~100.0%	0.1%	100.0%	Immediate	During running	PS
P08.20	Reserved	0~1	1	0	Immediate	At stop	PST
P08.21	Reserved	1~1000Hz	1	100	Immediate	At stop	PST
P09: Adjustment parameters							
P09.00	Offline inertia identification function	-	0.01	0.00	Immediate	At stop	PST
P09.01	Inertia identification maximum speed	200~2000rpm	1	500rpm	Immediate	At stop	PST
P09.02	Inertia identification acceleration time	10~1000ms	1	200ms	Immediate	At stop	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P09.03	Motor revolutions for inertia identification	0.00~655.35r	0.01r	0	Immediate	At stop	PST
P09.04	Waiting time after single inertia identification	50~10000	1ms	800ms	Immediate	At stop	PST
P09.05	Online inertia identification mode	0: Disabled 1: Enabled, change slowly 2: Enabled, change generally 3: Enabled, change quickly	1	0	Immediate	At stop	PST
P09.06	Gain adjustment mode	0: The parameter self-adjustment is invalid, and the parameter is adjusted manually 1: Parameter self-adjustment mode, use the rigidity table to automatically adjust the gain parameters 2: Positioning mode, use the rigidity table to automatically adjust the gain parameters	1	0	Immediate	At stop	PST
P09.07	Rigidity level	0~31	1	8	Immediate	During running	PST
P09.08	Adaptive notch filter mode	0: The 3rd and 4th notch filter parameters are not updated 1: 3rd notch filter parameter adaptive result update 2: 3rd and 4th notch filter parameter	1	0	Immediate	At stop	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		adaptive results update 3: Automatically detect the mechanical resonance frequency, but do not set the relevant parameters of the notch filter 4: All 4 notch filter parameters return to default values					
P09.09	Automatic suppression vibration sensitivity setting	1~100	1	1	Immediate	At stop	PST
P09.10	Notch filter 1 frequency	50~4000Hz	1	4000Hz	Immediate	At stop	PS
P09.11	Notch filter 1 Q value	0.6~6.50	0.01	0.7	Immediate	At stop	PS
P09.12	Notch filter 1 depth	0~100	1	0	Immediate	At stop	PS
P09.13	Notch filter 2 frequency	50~4000Hz	1	4000Hz	Immediate	At stop	PS
P09.14	Notch filter 2 Q value	0.6~6.50	0.01	0.7	Immediate	At stop	PS
P09.15	Notch filter 2 depth	0~100	1	0	Immediate	At stop	PS
P09.16	Notch filter 3 frequency	50~4000Hz	1	4000Hz	Immediate	At stop	PS
P09.17	Notch filter 3 Q value	0.6~6.50	0.01	0.7	Immediate	At stop	PS
P09.18	Notch filter 3 depth	0~100	1	0	Immediate	At stop	PS
P09.19	Notch filter 4 frequency	50~4000Hz	1	4000Hz	Immediate	At stop	PS
P09.20	Notch filter 4 Q value	0.6~6.50	0.01	0.7	Immediate	At stop	PS
P09.21	Notch filter 4 depth	0~100	1	0	Immediate	At stop	PS

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P10: Fault and protection parameters							
P10.00	Action upon phase loss	0: Activate protection upon input and output phase loss 1: No protection upon input phase loss 2: No protection upon output phase loss 3: No protection upon input and output	1	0	Immediate	During running	PST
P10.01	Action upon communication fault	0: Activate protection and coast to stop 1: Alarm and keep running 2: Alarm and stop according to the stop mode	1	0	Immediate	During running	PST
P10.02	Action upon temperature sampling disconnection	0: Activate protection and coast to stop 1: Alarm and keep running 2: Alarm and stop according to the stop mode	1	0	Immediate	During running	PST
P10.03	Action upon analog input fault	0: Activate protection and coast to stop 1: Alarm and keep running 2: Alarm and stop according to the stop mode	1	0	Immediate	During running	PST
P10.04	Overtravel stop mode selection	0: Activate protection and coast to stop 1: Alarm, decelerate to zero, keep position locked	1	2	Immediate	During running	P
P10.05	Action upon position deviation	0: Activate protection and coast to stop 1: Alarm and keep running	1	0	Immediate	During running	

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		2: Alarm and stop according to the stop mode					
P10.06	Overload protection setting for motor	0: Activate protection and coast to stop 1: Alarm and keep running	1	1	Immediate	At stop	PST
P10.07	Motor overload protection gain	20.0%~300.0%	0.1%	100.0%	Immediate	During running	PST
P10.08	Runaway protection selection	0: Disabled 1: Enabled	1	1	Immediate	At stop	PST
P10.09	Stall over temperature protection enable	0: Disable motor stall over-temperature protection detection 1: Enable motor stall over-temperature protection detection	1	1	Immediate	At stop	PST
P10.10	Stall over temperature protection time (reserved)	10~65535	1ms	100	Immediate	At stop	PST
P10.11	Motor temperature detection type	0: PTC130 1: KTY84	1	0	Immediate	At stop	PST
P10.12	Overspeed fault threshold	0~60000	1rpm	0	Immediate	At stop	PST
P10.13	Motor overheat alarm temperature	0.0~200.0℃	0.1℃	130.0	Immediate	At stop	PST
P10.14	Absolute encoder battery undervoltage fault handling	0: Set the low battery voltage as a fault, the drive monitors the battery voltage every time it is powered on or reset, and an undervoltage alarm will be reported for undervoltage, and no detection will be	1	0	Immediate	At stop	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		performed over time; 1: Low battery voltage is set as warning: battery undervoltage (below 3V) will warn, and battery voltage is always detected.					
P10.15	Function selection when the main circuit is under voltage	0: No main circuit undervoltage warning is detected; 1: The main circuit undervoltage warning is detected; 2: The main circuit undervoltage warning is detected, and the torque is limited.	1	0	Immediate	At stop	PST
P10.16	Torque limit value when main circuit undervoltage	0~100%	1%	100	Immediate	At stop	PST
P10.17	Main circuit undervoltage torque limit release time	0~1000ms	1ms	10	Immediate	At stop	PST
P10.18	Fault record	0: Current fault 1: Last fault 2: The last two fault ... 9: The last nine fault	1	0	Immediate	At stop	PST
P10.19	Selected number of fault codes	0: None 1: Acceleration overcurrent 2: Main circuit overvoltage 3: Control circuit overvoltage 4: Motor blocked 5: The power is not off after parameter modification	1	0	Immediate	At stop	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		6: Phase loss on the input side 7: Phase loss on the output side 8: Heatsink over-temperature 9: Braking resistor overload 10: FO fault 11: Servo drive overload 12: Motor overload 13: EEPROM fault 14: Serial port communication fault 15: External braking resistor is too small 16: Current detection fault 17: System interference 18: Parameter identification fault 19: The first encoder fault 20: Undervoltage during main circuit operation 21: AI function conflict 22: Parameter setting fault 23: Communication location reference overflow 24: Analog input fault 25: Temperature detection disconnection fault 26: Second encoder fault 27: Overspeed					

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		28: Runaway 29: Main circuit undervoltage 30: Encoder multi-turn count error 31: Encoder multi-turn count overflow 32: Position deviation is too large 33: Abnormal pulse input 34: The position deviation of the full closed loop is too large 35: Full closed-loop function parameter setting error 36: Bus connection interrupted 37: Homing timeout 38: DI emergency brake 39: Forward overtravel warning 40: Reverse overtravel warning 41: Encoder battery failure 42: Encoder angle identification failure 43: External fault 44: Contactor fault 45: Parameter copy fault 46: Short circuit to ground at power-on 47: Parameter per unit error 48~59: Reserved 60: Full closed loop					

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		second encoder z signal reverse 61: Electronic gear ratio error 62: The Z phase of the first encoder is reversed 63: Fully closed loop position deviation is too large 64: Pulse identification failed 65: Z pulse origin deviation is too large 66: Control voltage undervoltage during operation 67: Motor over temperature 68: Angle identification error 69: Excessive vibration 70: Over torque 71: Instantaneous overload of the motor 72: DB overload 73: Instantaneous overload of the drive 74: Reserved 75: Virtual homing error 76: EtherCAT initialization error, EEPROM not programmed 77: SOE mapping error 78: The distributed clock or the interpolation period is					

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		not an integral multiple of the interpolation calculation period 79: EEPROM not programmed					
P10.20	Output current at fault time	0.0~999.9A	0.1	0			
P10.21	Output voltage at fault time	0~999V	1	0			
P10.22	V-phase current at fault time	0.0~999.9A	0.1	0.0	-	At display	PST
P10.23	W-phase current at fault time	0.0~999.9A	0.1	0.0	-	At display	PST
P10.24	Speed at fault time	-60000~60000rpm	1	0	-	At display	PST
P10.25	DI status at fault time	Unit place of LED: BIT0~BIT3: DI1~DI4 Tens place of LED: BIT0~BIT3: DI5~DI8 Hundreds place of LED: BIT0: DI9	1	0	-	At display	PST
P10.26	DO status at fault time	Unit place of LED: BIT0~BIT3: DO1~DO4 Tens place of LED: BIT0: DO5	1	0	-	At display	PST
P10.27	Drive status at fault time	0~FFFFH (the same as P11.10)	1	0	-	At display	PST
P11: Display parameters							
P11.00	Speed command	-60000~60000rpm	1rpm		-	At display	S
P11.01	Actual motor speed	-60000~60000rpm	1rpm		-	At display	PST
P11.02	Output voltage	0~480V	1V		-	At display	PST
P11.03	Output current	0.0~4Ie	0.1A		-	At display	PST
P11.04	Q-axis current	-400.0~+400.0%Ie	0.1%		-	At display	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P11.05	D-axis current	-100.0~+100.0%Ie	0.1%		-	At display	PST
P11.06	Output torque	-400.0~+400.0%Te	0.1%		-	At display	PST
P11.07	Average load rate	0.0%~+400.0%	0.1%	0	-	At display	PST
P11.08	Bus voltage	0~900V	1V		-	At display	PST
P11.09	Control voltage	0~450V	1V		-	At display	PST
P11.10	Operation state of the servo drive	0~FFFFH Bit0: RUN/STOP Bit1: REV/FWD Bit2: Running at zero speed Bit3: Accelerating Bit4: Decelerating Bit5: Running at constant speed Bit6: Pre-exciting Bit7: Tuning Bit8: Over-current limiting Bit9: DC over-voltage limiting Bit10: Torque limiting Bit11: Speed limiting Bit12: Drive in fault Bit13: Speed control Bit14: Torque control Bit15: Position control	1		-	At display	PST
P11.11	DI terminal state	0~3FFH, 0: off; 1: on	1		-	At display	PST
P11.12	DO terminal state	0~FH, 0: open; 1: close	1		-	At display	PST
P11.13	AI1 input voltage	-10.00~10.000V	0.001V		-	At display	PST
P11.14	AI2 input voltage	-10.00~10.000V	0.001V		-	At display	PST
P11.15~	Reserved						

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P11.16							
P11.17	Input pulse frequency	0~4000.0kpps	0.1		-	At display	PS
P11.18	Corresponding speed of input pulse command	-9000~9000rpm	1rpm		-	At display	PS
P11.19	Motor encoder counter value	0~4 times motor encoder lines -1	1		-	At display	PST
P11.20	Motor encoder Z pulse position	0~4 times motor encoder lines -1	1		-	At display	PST
P11.21	Number of input pulses	-2147483648~2147483647			-	At display	PST
P11.22	Position reference point position	-2147483648~2147483647	1		-	At display	P
P11.23	Position reference	-2147483648~2147483647	1		-	At display	P
P11.24	Position feedback	-2147483648~2147483647	1		-	At display	P
P11.25	Position error pulse	-2147483648~2147483647	1		-	At display	P
P11.26	Position reference point position (PUU unit)	-2147483648~2147483647	1		-	At display	P
P11.27	Position reference (PUU unit)	-2147483648~2147483647	1		-	At display	P
P11.28	Position feedback (PUU unit)	-2147483648~2147483647	1		-	At display	P
P11.29	Position error pulse (PUU unit)	-2147483648~2147483647	1		-	At display	P
P11.30	Motor temperature	-40.0~200.0℃	0.1℃		-	At display	PST
P11.31	Accumulated power-on hours	0 ~ maximum 65535 hours	1 hour		-	At display	PST
P11.32	Accumulated work hours	0 ~ maximum 65535 hours	1 hour		-	At display	PST
P11.33	Module	-40.0℃~150.0℃	0.1℃		-	At	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
	temperature					display	
P11.34	Absolute encoder single-turn position	0~8388608	1		-	At display	PST
P11.35	Absolute encoder rotation data	0~65535r	1r		-	At display	PST
P11.36	Load moment of inertia ratio	0.00~120.00	0.01		-	At display	PST
P11.37	SinCos encoder signal amplitude	0~30000	1		-	At display	PST
P11.38	SinCos encoder count value (after subdivision)	0~8388608	1		-	At display	PST
P11.39	SinCos encoder Z pulse position (after subdivision)	0~8388608	1		-	At display	PST
P11.40	SinCos encoder one-turn resolution (after subdivision)				-	At display	PST
P11.41	SinCos encoder count value (after quadrupling frequency according to P05.05)	0~8388608	1		-	At display	PST
P11.42	SinCos encoder Z pulse position (after quadrupling frequency according to P05.05)	0~8388608	1		-	At display	PST
P11.43	Bus position feedback	-2147483648~2147483647	1	0	-	At display	PST
P11.44	Bus Z pulse position	-2147483648~2147483647	1	0	-	At display	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P11.45	Mechanical angle (number of pulses from origin)	0.000~359.999°	°	0.000	-	At display	PST
P11.46	Electrical angle	0.00~359.99°	°	0.00	-	At display	PST
P11.47	Electrical angle test 1	0.00~359.99°	°	0.00	-		
P11.48	Electrical angle test 2	0.00~359.99°	°	0.00	-	At display	S
P11.49~ P11.57	Reserved						
P12: Spindle indexing parameters							
P12.00	Spindle indexing selection	0: Indexing disabled 1: Indexing enabled	1	0	Immediate	During running	P
P12.01	Homing mode	Origin detector types and looking for direction settings 0: Homing according to the current running direction, CCWL as a return to the origin 1: Homing according to the current running direction, CWL as a return to the origin 2: Forward homing, ORGP as a return to the origin 3: Reverse homing, ORGP as a return to the origin 4: The shortest distance homing, ORGP as a return to the origin 5: Homing according to the current running direction, ORGP as a return to the origin	1	9	Immediate	During running	P

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		6: Forward looking for Z pulse as a return to the origin 7: Reverse looking for Z pulse as a return to the origin 8: The shortest distance looking for Z pulse as a return to the origin 9: Homing according to the current direction, Z pulse as a return to the origin					
P12.02	Homing command mode	0: Level mode 1: Pulse mode	1	0	Immediate	During running	P
P12.03	Origin correction mode	0: Single correction 1: Real-time correction	1	0	Immediate	During running	P
P12.04	Homing docking selection	0: Stop at the left side of the origin 1: Stop at the right side of the origin	1	0	Immediate	During running	
P12.05	Encoder installation position	0: Mounted on the motor shaft 1: Mounted on the spindle	1	0	Immediate	During running	
P12.06	Reserved					At stop	
P12.07	Spindle transmission ratio	0.000~30.000	0.001	1.000	Immediate	During running	P
P12.08	Origin search speed	1~300rpm	1	10	Immediate	At stop	P
P12.09	Origin position offset	0~360.000	1	180.000	Immediate	During running	P
P12.10	Reserved	0~1	1	0	Immediate	During running	P
P12.11	Reserved	1~65535	1	5	Immediate	During running	P
P12.12	Indexing angle 1	0.000~359.999	0.001°	0	Immediate	During running	P

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P12.13	Indexing angle 2	0.000~359.999	0.001°	0	Immediate	During running	P
P12.14	Indexing angle 3	0.000~359.999	0.001°	0	Immediate	During running	P
P12.15	Indexing angle 4	0.000~359.999	0.001°	0	Immediate	During running	P
P12.16	Indexing angle 5	0.000~359.999	0.001°	0	Immediate	During running	P
P12.17	Indexing angle 6	0.000~359.999	0.001°	0	Immediate	During running	P
P12.18	Indexing angle 7	0.000~359.999	0.001°	0	Immediate	During running	P
P12.19	Indexing angle 8	0.000~359.999	0.001°	0	Immediate	During running	P
P12.20	Indexing angle 9	0.000~359.999	0.001°	0	Immediate	During running	P
P12.21	Indexing angle 10	0.000~359.999	0.001°	0	Immediate	During running	P
P12.22	Indexing angle 11	0.000~359.999	0.001°	0	Immediate	During running	P
P12.23	Indexing angle 12	0.000~359.999	0.001°	0	Immediate	During running	P
P12.24	Indexing angle 13	0.000~359.999	0.001°	0	Immediate	During running	P
P12.25	Indexing angle 14	0.000~359.999	0.001°	0	Immediate	During running	P
P12.26	Indexing angle 15	0.000~359.999	0.001°	0	Immediate	During running	P
P12.27	Indexing angle 16	0.000~359.999	0.001°	0	Immediate	During running	P
P12.28	Positioning speed	0~2000rpm	1rpm	500	Immediate	During running	P
P12.29	Positioning acceleration time	0.01~300.00s	0.01s	2.00	Immediate	During running	P
P12.30	Positioning deceleration time	0.01~300.00s	0.01s	2.00	Immediate	During running	P
P12.31	Positioning status parameters	Unit place:The current reference position 1~8 Tens place:The	00H	00H	Immediate	During running	P

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		current position of the positioning completed 1~8					
P12.32	Spindle swing angle	0.0~360.0	0.1	30.0	Immediate	During running	P
P12.33	Spindle swing speed	1~1000rpm	1	50	Immediate	During running	P
P12.34	Spindle swing acceleration and deceleration time	0.00~60.00S	0.01	1.00	Immediate	During running	P
P12.35	Origin signal loss action	0: Been looking for 1: Report failure (Er.ORG) after looking for twice	1	1	Immediate	During running	P
P13: Motor 2 parameters							
P13.00	Motor selection	0~2	1	0	Immediate	At stop	PST
P13.01	Motor 2 rated power	0.04~99.99	0.01kW	1.3	Power-on again	At stop	PST
P13.02	Motor 2 rated voltage	0~9999	1V	380	Power-on again	At stop	PST
P13.03	Motor 2 rated current	0.1~999.9	0.1A	2.8	Power-on again	At stop	PST
P13.04	Motor 2 rated torque	0.2~6553.5	0.1N·m	4	Power-on again	At stop	PST
P13.05	Motor 2 maximum torque	0.2~6553.5	0.1N·m	12	Power-on again	At stop	PST
P13.06	Motor 2 rated frequency	1~3000	1Hz	50	Power-on again	At stop	PST
P13.07	Motor 2 rated speed	0~60000	1rpm	1450	Power-on again	At stop	PST
P13.08	Motor 2 maximum speed	0~60000	1rpm	6000	Power-on again	At stop	PST
P13.09	Motor 2 moment of inertia	0~65535	1kg*cm2	10	Power-on again	At stop	PST
P13.10	Motor 2 number of pole pairs	1~72	1	2	Power-on again	At stop	PST
P13.11	Motor 2 stator resistance	0~65	1Ω	1	Power-on again	At stop	PST
P13.12	Motor 2 leakage inductance or	0.00~655.35	0.01mH	5	Power-on again	During running	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
	D-axis inductance						
P13.13	Motor 2 mutual inductance or Q-axis inductance	0.00~655.35	0.01mH	5	Power-on again	During running	PST
P13.14	Motor 2 rotor resistance or back EMF constant	0~65	1Ω (V/rpm)	1	Power-on again	During running	PST
P13.15	Motor 2 no-load current	0.1~999.9	0.1A	1	Power-on again	During running	PST
P13.16	Switching delay	100~800	1ms	300	Power-on again	During running	PST
P13.17	Reserved	0~1	1	1	Power-on again	During running	PST
P13.18	Reserved	0~100	1	30	Power-on again	During running	PST
P13.19	Switching speed	2000~20000	1rpm	6000	Power-on again	During running	PST
P13.20	Switching speed hysteresis	50~1000	1rpm	200	Power-on again	During running	PST
P13.21	Reserved	0~65535	1	0	Power-on again	During running	PST
P13.22	Reserved	0~65535	1	0	Power-on again	During running	PST
P13.23	Reserved	0~65535	1	0	Power-on again	During running	PST
P14: Multi-stage speed parameters							
P14.00	Multi-speed command operation	0: Stop at the end of a single operation 1: Cyclic operation 2: Switch via external DI	1	1	Immediate	During running	S
P14.01	Speed command segments selection	1~16	1	16	Immediate	During running	S
P14.02	Runtime unit selection	0: s 1: min	1	0	Immediate	During running	S
P14.03	Acceleration time	0.0~6553.5ms	1ms	600	Immediate	At stop	S

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
	2						
P14.04	Deceleration time 2	0.0～6553.5ms	1ms	600	Immediate	At stop	S
P14.05	Acceleration time 3	0.0～6553.5ms	1ms	600	Immediate	At stop	S
P14.06	Deceleration time 3	0.0～6553.5ms	1ms	600	Immediate	At stop	S
P14.07	Acceleration time 4	0.0～6553.5ms	1ms	600	Immediate	At stop	S
P14.08	Deceleration time 4	0.0～6553.5ms	1ms	600	Immediate	At stop	S
P14.09	1st stage speed command	-9000~9000rpm	1rpm	0	Immediate	During running	S
P14.10	1st stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.11	1st stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4	1	0	Immediate	During running	S
P14.12	2nd stage speed command	-9000~9000rpm	1rpm	200	Immediate	During running	S
P14.13	2nd stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.14	2nd stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and	1	0	Immediate	During running	S

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		deceleration time 4					
P14.15	3rd stage speed command	-9000~9000rpm	1rpm	400	Immediate	During running	S
P14.16	3rd stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.17	3rd stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4	1	0	Immediate	During running	S
P14.18	4th stage speed command	-9000~9000rpm	1rpm	600	Immediate	During running	S
P14.19	4th stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.20	4th stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4	1	0	Immediate	During running	S
P14.21	5th stage speed command	-9000~9000rpm	1rpm	800	Immediate	During running	S
P14.22	5th stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.23	5th stage speed command acceleration and deceleration time	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1	1	0	Immediate	During running	S

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
	selection	2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4					
P14.24	6th stage speed command	-9000~9000rpm	1rpm	600	Immediate	During running	S
P14.25	6th stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.26	6th stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4	1	0	Immediate	During running	S
P14.27	7th stage speed command	-9000~9000rpm	1rpm	400	Immediate	During running	S
P14.28	7th stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.29	7th stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4	1	0	Immediate	During running	S
P14.30	8th stage speed command	-9000~9000rpm	1rpm	200	Immediate	During running	S
P14.31	8th stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P14.32	8th stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4	1	0	Immediate	During running	S
P14.33	9th stage speed command	-9000~9000rpm	1rpm	0	Immediate	During running	S
P14.34	9th stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.35	9th stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4	1	0	Immediate	During running	S
P14.36	10th stage speed command	-9000~9000rpm	1rpm	-200	Immediate	During running	S
P14.37	10th stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.38	10th stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4	1	0	Immediate	During running	S

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P14.39	11th stage speed command	-9000~9000rpm	1rpm	-400	Immediate	During running	S
P14.40	11th stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.41	11th stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4	1	0	Immediate	During running	S
P14.42	12th stage speed command	-9000~9000rpm	1rpm	-600	Immediate	During running	S
P14.43	12th stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.44	12th stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4	1	0	Immediate	During running	S
P14.45	13th stage speed command	-9000~9000rpm	1rpm	-800	Immediate	During running	S
P14.46	13th stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.47	13th stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2	1	0	Immediate	During running	S

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4					
P14.48	14th stage speed command	-9000~9000rpm	1rpm	-600	Immediate	During running	S
P14.49	14th stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.50	14th stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4	1	0	Immediate	During running	S
P14.51	15th stage speed command	-9000~9000rpm	1rpm	-400	Immediate	During running	S
P14.52	15th stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.53	15th stage speed command acceleration and deceleration time selection	0- Zero acceleration and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4	1	0	Immediate	During running	S
P14.54	16th stage speed command	-9000~9000rpm	1rpm	-200	Immediate	During running	S
P14.55	16th stage speed command running time	0~6553.5	0.1s (min)	0.5	Immediate	During running	S
P14.56	16th stage speed	0- Zero acceleration	1	0	Immediate	During	S

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
	command acceleration and deceleration time selection	and deceleration time 1- Acceleration and deceleration time 1 2- Acceleration and deceleration time 2 3- Acceleration and deceleration time 3 4- Acceleration and deceleration time 4				running	
P15: Modbus communication parameters							
P15.00	Drive Modbus communication address	0~247 (0 is the broadcast address during Modbus communication)	1	5	Immediate	At stop	PST
P15.01	Modbus communication configuration	0~54	1	2	Immediate	At stop	PST
P15.02	Modbus communication timeout detection time	0.0~1000.0ms (When the parameter is set to 0, no disconnection detection is performed)	0.1	0.0s	Immediate	At stop	PST
P15.03	Modbus response delay	0~1000ms	1	5ms	Immediate	At stop	PST
P17: EtherCAT communication parameters (only supported by EtherCAT communication version)							
P17.00	EtherCAT software version number	000~FFF	1		-	At display	-
P17.01	EtherCAT bus sub-protocol	101: COE 102: SOE (reserved) Other: Reserved	1	-	-	At display	-
P17.02	EtherCAT bus status	1: INIT 2: PRE-OPERATIONAL 3: SAFE-OPERATIONAL 4: OPERATIONAL	1	-	-	At display	-
P17.03	Bus working mode	Drive working mode when controlled by CANopen and	1	-	-	At display	-

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		EtherCAT COE bus: 1: Profile Position Mode 3: Profile Velocity Mode 6: Homing Mode 7: Interpolated Position Mode 8: Cyclic Synchronous Position Mode 9: Cyclic Synchronous Velocity Mode					
P17.04~ P17.13	EtherCAT bus output data mapping	0~0xFFFF	1	0	Power-on again	At stop	-
P17.14~ P17.23	EtherCAT bus input data mapping	0~0xFFFF	1	0	Power-on again	At stop	-
P17.24	Whether EtherCAT communication write function code parameters are stored in EEPROM	0: Do not store 1: The data written through the EtherCAT bus is stored to the EEPROM of the drive	1	1	Immediate	At stop	-
P18: Advanced parameters							
P18.00	SinCos Z pulse type	0~65535	1	0	Immediate	At stop	PST
P18.01	SinCos encoder Z pulse inversion	0~1	1	1	Immediate	At stop	PST
P18.02	Current loop gain	0.01~50.00	0.01	6	Immediate	At stop	PST
P18.03	Current loop integral	0.5~100.0ms	0.1ms	4	Immediate	At stop	PST
P18.04	Bus voltage suppression point	0~800V	1V	720	Immediate	At stop	PST
P18.05	Bus voltage suppression gain	0~6500.0	1	3	Immediate	At stop	PST
P18.06	Bus voltage suppression integral	0~6500.0	0.1ms	6	Immediate	At stop	PST

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P18.07	Weak magnetic control gain	0~6500.0	0.1	60	Immediate	At stop	PST
P18.08	Weak magnetic control integral	0~6500.0	0.1ms	70	Immediate	At stop	PST
P18.09~ P18.41	Reserved	-	-	-	-	-	-
P18.42	SinCos encoder SIN zero offset correction	-8000~8000	1	0	Immediate	At stop	PST
P18.43	SinCos encoder COS zero offset correction	-8000~8000	1	0	Immediate	At stop	PST
P19: Full closed loop control parameters							
P19.00	Full closed loop enable	0: Disable 1: Full closed loop enable 2: Enable terminal switching full closed loop control	1	0	Immediate	At stop	PS
P19.01	External encoder direction selection	0~1	1	0	Immediate	At stop	PS
P19.02	External encoder type	0: Photoelectric encoder 1: SinCos encoder	1	0	Immediate	At stop	PS
P19.03	Full closed loop position deviation too large threshold	0~1073741824 Set the absolute threshold of position deviation for full closed loop position deviation fault Er.063	1	0	Immediate	At stop	PS
P19.04	Full closed loop position deviation clear setting	0~100 =0; Always clear full closed loop position deviation !=0; Within N rotations of the servo motor, if the position deviation is always less than P19.03, the	1	0	Immediate	At stop	PS

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
		full-closed loop position deviation will be cleared at the Nth rotation, and the position deviation will be recounted with the number of motor rotations; if it is greater than P19.03, Er.063 will be alarmed. (full closed loop position deviation is too large)					
P19.05	External encoder filtering	0.0~1000.0	0.1ms	0	Immediate	At stop	PS
P19.06	Number of external encoder lines	0~65535	1	2500	Immediate	During running	PS
P19.07	Inner loop and outer loop position proportional coefficient numerator	1~1073741824 The number of pulses corresponding to the motor side	1	10000	Immediate	At stop	PS
P19.08	Inner loop and outer loop position proportional coefficient denominator	1~1073741824 Number of pulses per revolution on the spindle side	1	10000	Immediate	At stop	PS
P19.09	Auto-tuning scale factor	0~1	1	0	Immediate	During running	PS
P19.10	Full-closed loop position deviation count (relative to external pulse amplification)	-1073741824~+1073741824	1	0	Immediate	At stop	PS
P19.11	Reserved	-1073741824~+1073741824	1	0	Immediate	At stop	PS
P19.12	Reserved	-1073741824~+1073741824	1	0	Immediate	At stop	PS

Function code	Name	Setting range	Min. unit	Default value	Effective time	Property	Mode
P19.13	External encoder side position reference	-1073741824~+1073741824	1	0	Immediate	At stop	PS
P19.14	External encoder position feedback	-1073741824~+1073741824	1	0	Immediate	At stop	PS
P19.15	Position error	-9999~+9999	1	0	Immediate	At stop	PS
P19.16	External encoder count value	0~65535	1	0	Immediate	At stop	PS
P19.17	External encoder Z pulse position	0~65535	1	0	Immediate	At stop	PS
P20: MECHATROLINK-III bus parameters							
P20.00	M3 slave station number	1~128	1	4	Immediate	At stop	PS
P20.01	Interpolation time	500 ~ 4000us	1us	3000us	Immediate	At stop	PS
P20.02	Reserved						
P20.03	Reserved	0~1	1	0	Immediate	At stop	PS
P20.04	Speed mode rigidity level in M3 bus mode	0~31 (setting 0 means not to switch the rigidity level in the speed mode, the rigidity level is P09.07)	1	0	Immediate	At stop	PS
P20.05	Running direction	0: Current direction 1: Negate	1	0	Immediate	At stop	PS
P20.06	Origin offset (BLU)	0~360000	1	0	Immediate	At stop	PS
P20.07~ P20.20	Reserved	-	-	-	-	-	-

Appendix 1 Double Closed Loop Debugging

Double closed loop debugging

Function code	Name	Setting range	Min. unit	Default value
P19.00	Full closed loop enable	0: Disable 1: Full closed loop enable 2: Enable terminal switching full closed loop control	0	1
P19.01	External encoder direction selection	0~1	0	0
P19.02	External encoder type	0: Photoelectric encoder 1: SinCos encoder	0	0
P19.05	External encoder filtering	0.0~1000.0	0.1ms	0
P19.06	Number of external encoder lines	1~65535	1	1024
P19.07	Inner loop and outer loop position proportional coefficient numerator	1~1073741824 The number of pulses corresponding to the motor side	1	10000
P19.08	Inner loop and outer loop position proportional coefficient denominator	1~1073741824 Number of pulses per revolution on the spindle side	1	10000
P19.09	Auto-tuning scale factor	0~1	1	1
P19.10	Full-closed loop position deviation count (relative to external pulse amplification)	-1073741824~+1073741824	1	0
P19.11	Reserved	-1073741824~+1073741824	1	0
P19.12	Reserved	-1073741824~+1073741824	1	0
P19.16	External encoder count value	0~65535	1	0
P19.17	External encoder Z pulse position	0~65535	1	0

Double closed-loop transmission ratio tuning :

P19.00=1, P19.02=0, P19.06=1024, after setting the double closed-loop parameters, P06.01=100, P02.01=1 to run, then P19.09=1 (the default value is 1, change it to 0 to enable transmission ratio tuning , and it will automatically become 1 after tuning is completed; then check P19.07, P19.08,which is the tuned transmission ratio coefficient), check whether P19.11, P19.12 (PG1, PG2 counting direction) are both positive or negative, if not, it means that the direction of PG2 is reversed, and the direction of PG2 should be reversed manually. P19.01=1 (default is 0), and the double closed-loop debugging is completed.

(Note: If 019 fault is reported, turn the motor manually, and check whether the external encoder count value P19.16 has a value. If there is no value, it means the encoder has no signal. Check the external encoder wiring.)

Appendix 2 Warranty and Service

Shenzhen Megmeet Electrical Co., Ltd. manufactures motor drive products strictly according to the ISO9001:2008 standard. In case of any product abnormalities, please contact the distributor or the headquarters. Our company will provide full technical support for you.

1. Warranty period

The product is warranted for 18 months from the purchase date, however, the warranty date shall not exceed 24 months after the manufacturing date on the nameplate.

2. Warranty scope

During the warranty period, any product abnormalities incurred due to our company can be freely repaired or replaced by our company. In case of the following situations, maintenance fees will also be charged even if the product is still in the warranty period.

(1) The damages are caused by fire, flood, strong lightning strike, etc.

(2) The damages are caused by users' unauthorized modifications.

(3) The product is damaged due to drop or in transmission after the purchase.

(4) The product is damaged because the standard requirements are not obeyed in actual use.

(5) The product is damaged because the user does not follow the instructions of the user manual.

3. After-sales service

(1) If there are specific requirements for drive installation and trial operation, or the working status of the drive is not satisfactory (such as unsatisfactory performance and function), please contact the distributor or Shenzhen Megmeet Electrical Co., Ltd.

(2) In case of any abnormality, contact the distributor or Shenzhen Megmeet Electrical Co., Ltd. immediately for help.

(3) During the warranty period, our company will repair any drive abnormality incurred due to the product manufacturing and design free of charge.

(4) If the product is out of the warranty period, our company can provide paid repairing service according to the customers' needs.

(5) The service charge is calculated by actual costs. If there is an agreement, the agreement shall prevail.

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