



DS5E/L series servo driver

Fast manual

This manual is suitable for the following users

- Servo system designer
- Installation and wiring workers
- Commissioning and servo commissioning workers
- Maintenance and inspection workers

Statement of responsibility

- Although the contents of the manual have been carefully checked, errors are inevitable, and we can't guarantee complete consistency.
- We will often check the contents of the manual and correct them in subsequent versions. We welcome your valuable comments.
- Please understand that the contents described in the manual are subject to change without notice.

Contact us

If you have any questions about the use of this product, please contact the agent and office purchasing the product, or directly contact Xinje company.

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►► Confirmation of products upon arrival

After the products arrive, please confirm the integrity of the products in the following aspects.

Items	Notes
Does the product on arrival match the specified model?	Please confirm according to the nameplate of servo motor and servo unit.
Does the servomotor shaft rotate smoothly?	The servo motor shaft is normal if it can be turned smoothly by hand. Servo motors with brakes, however, cannot be turned manually.
Is there any damage?	Check the overall appearance, and check for damage or scratches that may have occurred during shipping.
Are there any loose screws?	Check screws for looseness using a screwdriver.
Is the motor code the same with the code in drive?	Check whether the motor code of the driver U3-70 and the motor label are consistent.

If any of the above is faulty or incorrect, contact Xinje or an authorized distributor.

►► Safety precautions

■ Confirmation when getting the product

- ✓ Do not install damaged drives, drives with missing parts, or drives with unqualified models.

■ Product installation

- ✓ Be sure to disconnect all external power before installing the drive.

■ Product wiring

- ✓ Be sure to disconnect all external power before wiring the drive.
- ✓ Please connect the AC power supply correctly to the special power terminal of the drive.
- ✓ Do not connect the output terminals u, V and W of the driver to the three-phase power supply.
- ✓ Please use 2mm² wire to ground the ground terminal of the driver.
- ✓ Please ensure that the encoder line and power line are loose and not tight to avoid cable damage.

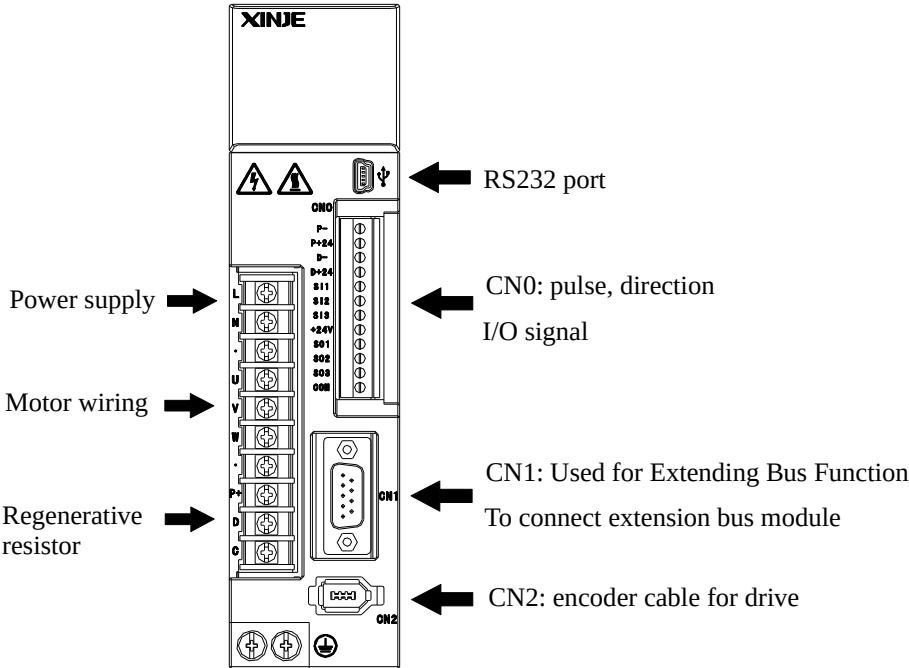
■ Operation and maintenance of products

- ✓ When powered on, be sure to install the panel shield.
- ✓ Do not touch the terminal within 10 minutes after disconnecting the power supply.
- ✓ During commissioning, do not connect the motor to the machinery.
- ✓ After connecting the machine, please set appropriate parameters of energy consumption before operation.
- ✓ Do not change the wiring when live.
- ✓ Do not touch the radiator during operation.

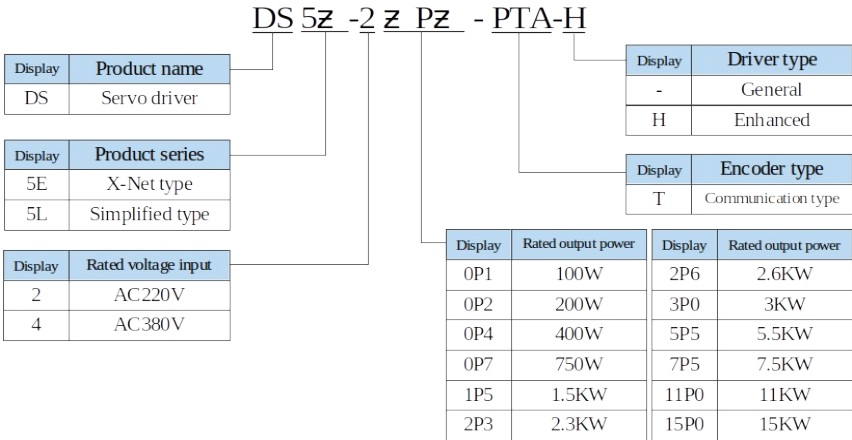
1. Servo system model selection

1-1.Servo driver model selection

1-1-1.Part description



1-1-2.Model naming rule



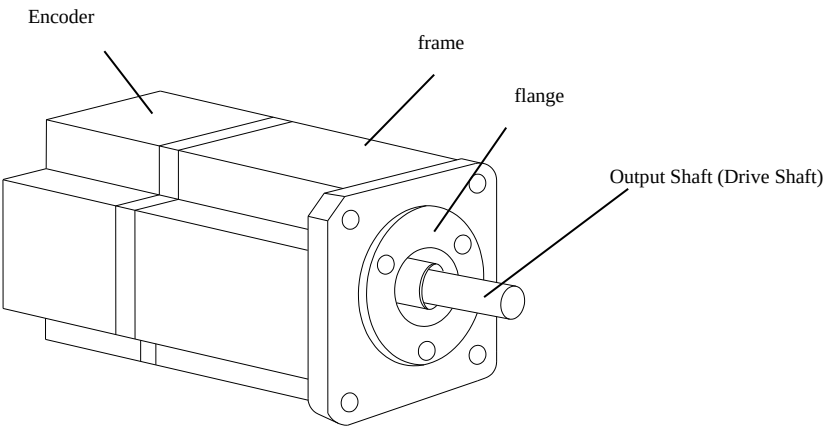
1-1-3.Performance specification

Servo unit		DS5E/DS5L series servo drive
Applicable encoder		Standard: 17-bit/23-bit communication encoder
Input power supply		DS5□-2□P□-PTA: Single/three phases AC200-240V, 50/60Hz Single phase AC200-240V 50/60Hz is used below 1.5KW (excluding 1.5KW); It is recommended to use three-phase AC200-240V 50/60Hz when the value is above 1.5KW (including 1.5KW). (For the single-phase power supply, please connect to R and T, otherwise the power failure will affect the memory of parameters.)
		DS5□-4□P□-PTA: three-phase AC340~420V, 50/60Hz
Control mode		Three-phase full-wave rectifier IPM PWM control sinusoidal current drive mode
Using condition	Using temperature	-10~+40 °C
	Storage	-20~+60 °C

	temperature	
	Environment humidity	Below 90%RH (no condensation)
	Vibration resistance	4.9m/s ²
Structure		Pedestal installation

1-2.Servo motor model selection

1-2-1.Parts description



1-2-2.Model naming rule

- MS5 motor model naming rule

MS5S - 80 ST E - C S 02430 B Z - 2 0P7 - S01

Name	Inertia
MS5S	Low inertia
MS5G	Middle inertia
MS5H	High inertia

Name	Seat number
60	60 seat
80	80 seat

Name	Product name
ST	Sine drive motor

Name	Product name
empty	No oil seal
E	With oil seal

Name	Encoder type
C	Magnetic encoder
T	Photoelectric encoder

Name	Encoder accuracy
S	Single circle 17-bit
M	Multi-circle 17-bit
U	Single circle 23-bit
L	Multi-circle 23-bit

Name	Rated torque (N·m)	Rated speed (rpm)
00630	0.637	3000
01330	1.3	3000
02430	2.39	3000

Name	Design number
S01	standard
S02	Small Aviation Plug

Name	Rated power (KW)
0P2	0.2
0P4	0.4
0P7	0.75

Name	Voltage level
2	220V
4	380V

Name	Power-off brake
Empty	without
Z	with

Name	Shaft
A	No key
B	With key

■ MS6 motor model naming rule

MS6S-60 C S 30 B Z 1-2 0P4

Display	Inertia
MS6S	Low inertia
MS6H	High inertia

Display	Base no.
40	Base 40
60	Base 60
80	Base 80
100	Base 100
130	Base 130
180	Base 180

Display	Encoder type
C	Magnetic encoder
T	Photoelectric encoder

Display	Encoder resolution
S	Single turn 17-bit
M	Multi turn 17-bit
U	Single turn 23-bit
L	Multi turn 23-bit

Display	Rated speed (rpm)
15	1500
20	2000
25	2500
30	3000

Display	Rated power	Display	Rated power
0P1	100W	1P8	1.8KW
0P2	200W	2P3	2.3KW
0P4	400W	3P0	3.0KW
0P7	750W	4P4	4.4KW
0P8	850W	5P5	5.5KW
1P5	1.5KW	7P5	7.5KW

Display	Voltage level
2	220V
4	380V

Display	Motor connector
1	AMP plug
2	Aviation plug
3	Connector (for IP67)

Display	Brake
-	Without brake
Z	With brake

Display	Motor shaft
A	With key and threaded hole, no oil seal
B	With key, threaded hole and oil seal
C	With threaded hole, no oil seal and key
D	No key, with threaded hole and oil seal
E	Special shaft (length, diameter, etc.)

Note: at present, the type selection of encoder is only the combination of CS, CM, TL and T!

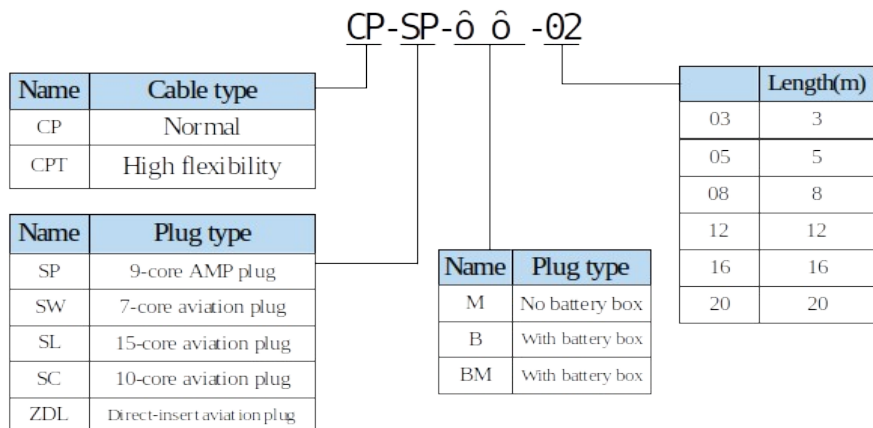
Standard type 1 is AMP plug for flange 80 and below.

Standard type 2 refers to a small aviation plug for flange 80 and below.

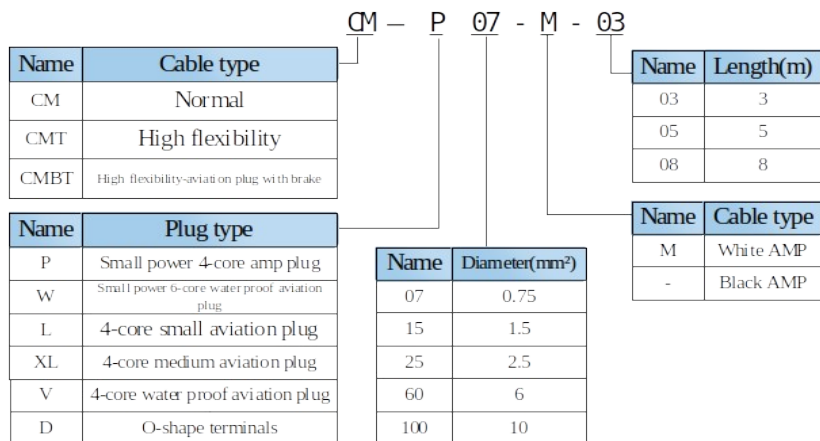
1-3.Cable selection

1-3-1.Cable configuration

■ Encoder cable model



■ Power cable model

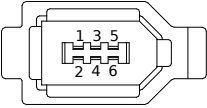


- Brake cable model
 - Applicable to flange 80 and below motors with motor suffix S01, brake cable model shall be selected: CB-P03-length (ordinary material) / CBT-P03-length (high flexible material).
 - Applicable to 750W and below motors with motor suffix S02: CMBT-W07-M -length.
 - For the MS5G series flange 130 medium inertia motors, the cable shall be selected as the integrated power cable and holding brake cable.
 - The standard wiring length of Xinje is 2 meters, 3 meters, 5 meters, 8 meters, 10 meters, 12 meters, 16 meters and 20 meters. The motors flange 80 and below with motor suffix S01 have specifications of 25 meters and 30 meters cables.

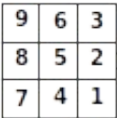
1-3-2. Definition of cable welding terminal

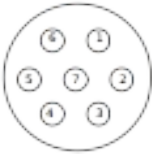
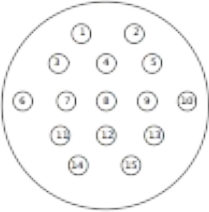
■ Encoder cable

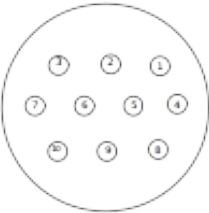
(1) Pin definition of encoder on servo driver side (220 flange and below)

Connector appearance	Pin definition	
	No.	Definition
	1	5V
	2	GND
	3	/
	4	/
	5	485-A
	6	485-B

(2) Cable connection of encoder on motor side (220 flange and below)

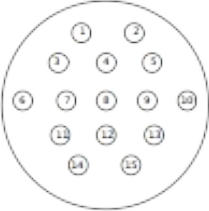
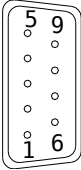
Connector pins	Pin definition		Suitable model
	No.	Definition	
	1	Battery +	MS5-40, 60, 80 flange -S01 motor MS6-40, 60, 80 flange B1 motor
	2	Battery -	
	3	Shielded cable	
	4	485-A	
	5	485-B	
	6	/	
	7	5V	
	8	GND	

	9	/	
	No.	Definition	MS5-40, 60, 80 flange -S02 motor MS6-40, 60, 80 flange B2 motor
	1	Shielded cable	
	2	Battery +	
	3	Battery -	
	4	485-A	
	5	485-B	
	6	5V	
	7	GND	
	No.	Definition	110 and above flange motor (exclude 130 flange medium inertia and 220 flange motor)
	1	Shielded cable	
	2	/	
	3	485-B	
	4	485-A	
	5	/	
	6	GND	
	7	Battery -	
	8	5V	
	9	Battery +	

	No.	Definition	130 flange medium inertia motor
	1	/	
	2	5V	
	3	GND	
	4	485-A	
	5	485-B	
	6	Battery +	
	7	Battery -	
	8, 9	/	
	10	Shielded cable	

(3) 220 flange encoder cable

Motor side	Driver side
------------	-------------


Pins	No.	Definition	No.	Pins
	1	Shielded cable	5	
	2	/	/	
	3	485-B	3	
	4	485-A	4	
	5	/	/	
	6	GND	6	
	7	Battery -	/	
	8	5V	8	
	9	Battery +	/	
	14	Temperature sensor	1	
	15	Temperature sensor	2	

Battery box description:

- (1) The encoder including the cable definition of battery +, battery- is for the absolute motor, and the non-absolute motor cable has no such pin.
- (2) Only the cable of absolute value motor has external battery box, which contains a 3.6V/2.7Ah large capacity battery, and has the function of replacing batteries when power cut. The using life is more than 2 years.



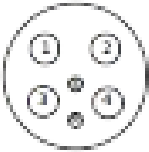

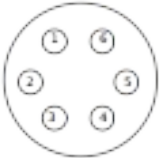

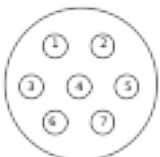
■ Power cable

- (1) Pin definition of power cable on servo driver side

Connector appearance	Pin definition	
	Color	Definition
	Brown	U
	Black	V
	Blue	W
	Yellow-green	PE

- (2) Power cable connection on motor side

Connector pin	Pin definition		Suitable model
	No.	Definition	

	1	U	40, 60, 80 flange -S01/B1 motor
	2	W	
	3	V	
	4	PE	
	1	BK+	40, 60, 80 flange -S01/B1 motor with brake
	2	BK-	
	1	PE	40, 60, 80 flange -S02 motor
	2	U	
	3	V	
	4	W	
	5	BK+	
	6	BK-	
	1	U	40, 60, 80 flange B2 motor
	2	W	
	3	V	
	4	PE	
	1	U	40, 60, 80 flange B2 motor with brake
	2	W	
	3	V	
	4	PE	
	5	BK+	
	6	BK-	
	1	PE	110 and above motor (include 130 flange medium inertia motor without brake)
	2	U	
	3	V	
	4	W	
	1	PE	130 flange medium inertia motor with brake
	2	U	
	3	V	
	4	W	
	5	BK+	
	6	BK-	
	7	/	

Brake pins:

The cable including BK pin is used for the brake motor. The cable of the non-brake motor has no BK pin.

1-4. Selection of regenerative resistance

1-4-1.Selection of regenerative resistance

When the servo motor is driven by the generator mode, the power returns to the servo amplifier side, which is called regenerative power. The regenerated power is absorbed by charging the smooth capacitor of the servo amplifier. After exceeding the rechargeable energy, the regenerative resistance is used to consume the regenerative power.

The servo motor driven by regenerative (generator) mode is as follows:

- The deceleration stop period during acceleration and deceleration operation;
- Running vertically and axially;
- When the external load drives the motor to rotate.

Servo driver model	Regenerative resistance connection terminals
DS5□-□□P□-PTA	<p>(1) Using built-in regenerative resistance, short P + and D terminals, P + and C are disconnected.</p> <p>(2) Use external regenerative resistance for 5.5kw and below drivers, connect regenerative resistance to P + and C terminals, remove P + and D short wiring, P0-25 = power value, P0-26 = resistance value.</p> <p>(3) Use external regenerative resistance for 5.5kw~11kw drivers, connect regenerative resistance to P + and PB terminals, P0-25 = power value, P0-26 = resistance value.</p> <p>(4) For 22kw servo drivers, connect regenerative resistance to the brake unit.</p> <p>Note: if software version U2-07 < 3700, the parameter P0-24 should be set. The firmware version U2-07 ≥ 3700, P0-24 does not need to be set and can be kept as the default.</p>

The following table is the recommended specifications of external regenerative resistance for each type of motor.

Servo driver model	Built-in brake unit	Rmin (Not less than this value)	External regenerative resistance (Recommended resistance value)	External regenerative resistance (Recommended power values)
DS5E/L-20P1-PTA	Built-in	50Ω	50Ω-100Ω	Above 200W
DS5E/L-20P2-PTA				
DS5E/L-20P4-PTA		40Ω	40Ω-100Ω	Above 500W
DS5E/L-20P7-PTA				
DS5E/L-21P0-PTA		25Ω	25Ω-50Ω	Above 1000W
DS5E/L-21P5-PTA				
DS5E/L-22P3-PTA				
DS5E/L-22P6-PTA				
DS5E-41P0-PTA		75Ω	75Ω-100Ω	Above 1000W
DS5E-41P5-PTA		55Ω	55Ω - 100Ω	Above 1000W
DS5E-43P0-PTA		55Ω	55Ω - 75Ω	Above 1000W
DS5E-43P0-PTA-H		55Ω	55Ω - 75Ω	Above 1200W
DS5E-45P5-PTA		25Ω	25Ω - 65Ω	Above 2000W
DS5E-45P5-PTA-H				
DS5E-47P5-PTA		25Ω	25Ω - 50Ω	Above 2000W
DS5E-47P5-PTA-H		22Ω	22Ω - 50Ω	Above 2500W
DS5E-411P0-PTA		20Ω	20Ω - 45Ω	Above 3000W
DS5E-415P0-PTA		20Ω	20Ω - 45Ω	Above 3000W
DS5E-422P0-PTA	-	20Ω	20Ω - 30Ω	Above 5000W

Note:

(1) The smaller the resistance is, the faster the discharge will be, but the smaller the resistance is, the easier the breakdown resistance will be. Therefore, please close to the the lower limit but not be less than the lower limit when choosing the type.

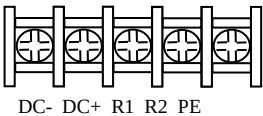
(2) When wiring, please use high-temperature flame-retardant wire, and the regenerative resistance surface can not contact with the wire.

(3) 22kw servo driver DS5E-422P0-PTA has no built-in brake unit, the external brake unit is optional part. The model is DBM-4110.

1-4-2.Brake unit (DBM-4110) specification

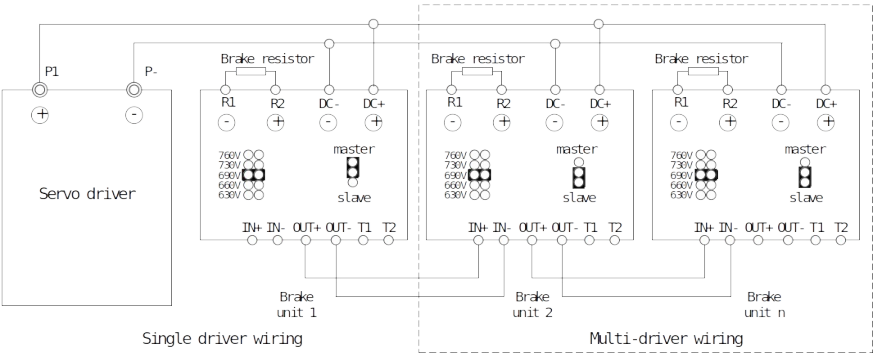


Pin definition



Pin name	Description
DC-	Connect to DC bus -
DC+	Connect to DC bus +
R1	Connect to one terminal of brake unit
R2	Connect to another terminal of brake unit
PE	Connect to the ground

Wiring diagram



2. Servo driver and motor installation

2-1.Servo driver installation

2-1-1.Installation site

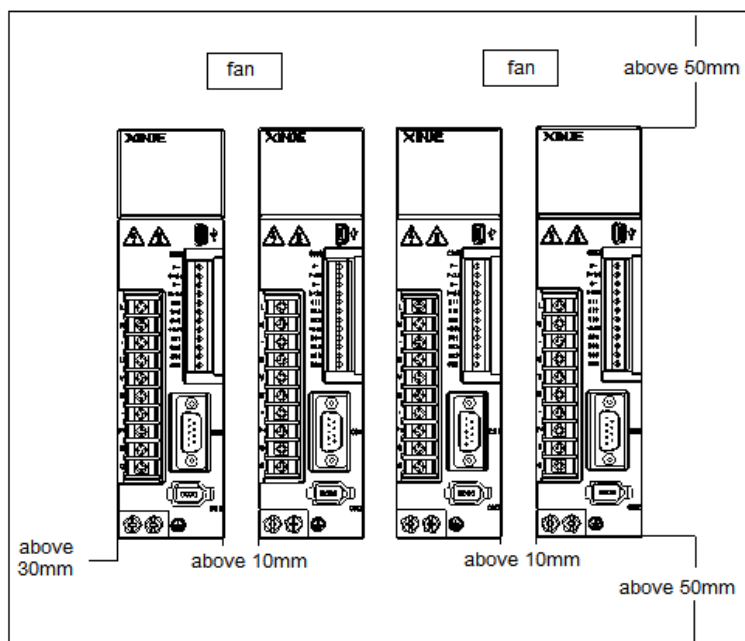
- ◆ Please install it in the installation cabinet without sunshine or rain.
- ◆ Do not use this product near corrosive and flammable gas environments such as hydrogen sulfide, chlorine, ammonia, sulfur, chlorinated gas, acid, alkali, salt, etc.
- ◆ Do not install in high temperature, humidity, dust, metal dust environment.
- ◆ No vibration place.

2-1-2.Environment condition

Item	Description
Use ambient temperature	-10~40°C
Use ambient humidity	-20~90%RH (no condensation)
Storage temperature	-20~60°C
Storage humidity	-20~90%RH (no condensation)
Vibration resistance	$\leq 4.9\text{m/s}^2$
Altitude	No more than 1000m, please derate to use when it is higher than 1000m (derate 1% for every 100m high)

2-1-3.Installation standard

Be sure to comply with the installation standard in the control cabinet shown in the figure below. This standard is applicable to the situation where multiple servo drivers are installed side by side in the control cabinet (hereinafter referred to as "when installed side by side").



■ Servo Drive Orientation

Install the servo drive perpendicular to the wall so the front panel containing connectors faces outward.

■ Cooling

As shown in the figure above, allow sufficient space around each servo drive for cooling by cooling fans or natural convection.

■ Side-by-side Installation

When install servo drives side by side as shown in the figure above, make at least 10mm between and at least 50mm above and below each servo drive. Install cooling fans above the servo drives to avoid excessive temperature rise and to maintain even temperature inside the control panel.

■ Environmental Conditions in the Control Panel

- Servo driver working ambient Temperature: $-10\sim 40\text{ }^{\circ}\text{C}$
- Humidity: 90%RH or less
- Vibration: 4.9m/s^2

- Condensation and Freezing: None
- Ambient Temperature for Long-term Reliability: 50°C maximum

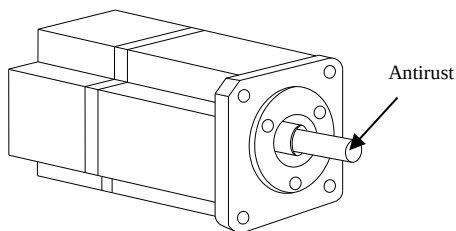
2-2.Servo motor installation

MS series servomotors can be installed either horizontally or vertically. The service life of the servomotor can be shortened or unexpected problems might occur if it is installed incorrectly or in an inappropriate location. Follow these installation instructions carefully.



CAUTION

1. The end of the motor shaft is coated with antirust. Before installing, carefully remove all of the paint using a cloth moistened with paint thinner.
2. Avoid getting thinner on other parts of the servo motor.

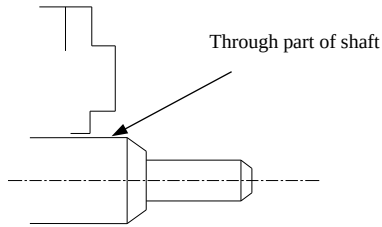


2-2-1.Installation environment

- ◆ Do not use this product near corrosive and flammable gas environments such as hydrogen sulfide, chlorine, ammonia, sulfur, chlorinated gas, acid, alkali, salt, etc.
- ◆ In places with grinding fluid, oil mist, iron powder, cutting, etc., please choose motor with oil seal.
- ◆ A place away from heat sources such as stoves;
- ◆ Do not use motor in enclosed environment. Closed environment will lead to high temperature and shorten service life of motor.

2-2-2.Environment condition

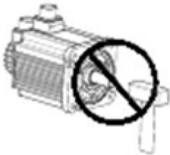
When used in places with water droplets or oil droplets, the protection effect can be achieved through the treatment of motors. However, in order to seal the through part of the shaft, please specify the motor with oil seal. Connectors should be installed downward.

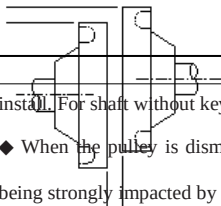


MS series servo motors are for indoor use. Please use them under the following installation conditions:

Item	Description
Use ambient temperature	-10°C~40°C (no freeze)
Use ambient humidity	20%~90%RH (no condensation)
Storage temperature	-20°C~60°C
Storage humidity	-20%~90%RH (no condensation)
Protection level	IP65(MS5)/IP66 (MS6)

2-2-3.Installation cautions


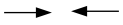
Item	Description
Antirust treatment	◆ Before installation, please wipe the "rust-proof agent" of the extension end of the servo motor shaft, and then do the relevant rust-proof treatment.
Encoder cautions	<p>◆ It is forbidden to impact the extension end of the shaft during installation, otherwise the internal encoder will be broken.</p> 
Encoder cautions	<p>When the pulley is installed on the servo motor shaft with keyway, the screw hole is used at the end of the shaft. In order to install the pulley, the double-headed nails are inserted into the screw holes of the shaft, the washer is used on the surface of the coupling end, and the pulley is gradually locked with the nut.</p> <p>◆ For the servo motor shaft with keyway, use the screw hole at the end of the shaft to</p>



install. For shaft without keyway, friction coupling or similar methods are used.

◆ When the pulley is dismantled, the pulley mover is used to prevent the bearing from being strongly impacted by the load.

◆ To ensure safety, protective covers or similar devices, such as pulleys installed on shaft, are installed in the rotating area.

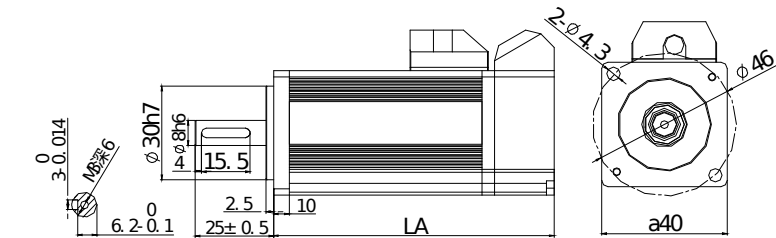
Item	Description
Centering	<p>◆ When installing the servo motor, make it conform to the centering accuracy requirement shown in the picture below. If the centering is inadequate, vibration will occur, and sometimes the bearing and encoder may be damaged. When installing the coupling, please do not directly impact the motor shaft, otherwise the encoder installed on the opposite side of the load shaft will be damaged.</p> <p>The maximum and minimum deviations are less than 0.03mm (rotated with the coupling) measured at four locations in a circle.</p>  <p>The maximum and minimum deviations are less than 0.03mm (rotated with the coupling) measured at four locations in a circle.</p> 
Installation direction	<p>◆ Servo motor can be installed in horizontal or vertical direction.</p>
Oil and water solutions	<p>When using in places where water droplets are dropping, please use it on the basis of confirming the protection level of servo motor. (except for the shaft-through part) When oil droplets will drip into the shaft-through part, please specify the servo motor with oil seal.</p> <p>Conditions for use of servo motors with oil seals:</p> <p>◆ Make sure the oil level is below the lip of the oil seal when using.</p> <p>◆ Please use the oil seal to keep the splash of oil droplets in good condition.</p> <p>◆ When the servo motor is installed vertically upward, please pay attention not to oil accumulation on the lip of the oil seal.</p>

Stress state of cable	<p>◆ Do not "bend" or apply "tension" to the wire, especially the core of the signal line is 0.2mm or 0.3mm, very thin, so when wiring (using), do not make it too tight.</p>
Processing of Connector Part	<p>For the connector part, please pay attention to the following items:</p> <p>◆When connecting the connector, please make sure that there is no foreign matter such as garbage or metal sheets in the connector.</p> <p>◆When connecting the connector to the servo motor, it is necessary to connect the connector from the side of the main circuit cable of the servo motor first, and the grounding wire of the main cable must be connected reliably. If one side of the encoder cable is connected first, the encoder may fail due to the potential difference between PE.</p> <p>◆When wiring, please make sure that the pins are arranged correctly.</p> <p>◆Connectors are made of resin. Do not apply shock to avoid damaging the connector.</p> <p>◆When carrying out the operation under the condition that the cable remains connected, it is necessary to grasp the main body of the servo motor. If only the cable is seized for handling, it may damage the connector or pull the cable off.</p> <p>◆If bending cable is used, full attention should be paid to the wiring operation and stress should not be applied to the connector part. If the stress is applied to the connector part, the connector may be damaged.</p>

2-3.Servo motor dimension

■ 40 series motor installation dimension Unit: mm

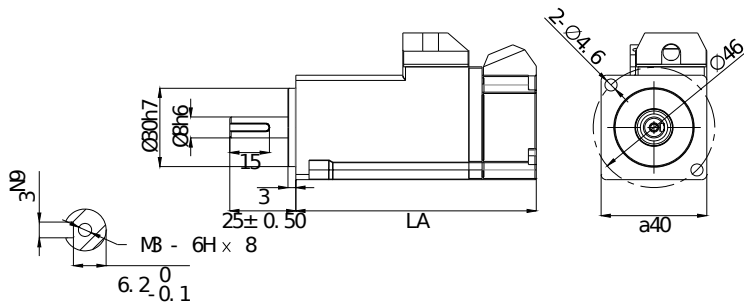
◆ MS5 motor



Motor model	LA±1	Inertia level
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	Normal	With brake	
MS5S-40STE-C□0030□□-20P1-S01/S02	89.5	119	Low inertia

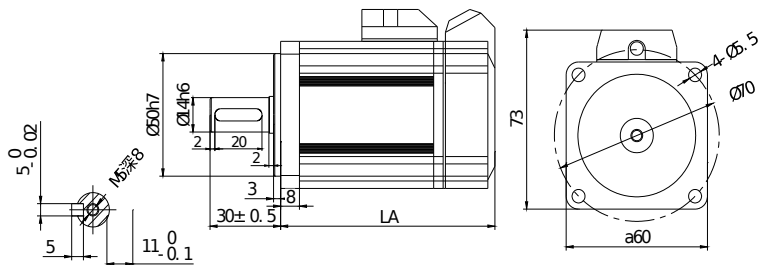
◆ MS6 motor



Motor model	LA \pm 1		Inertia level
	Normal	With brake	
MS6H-40C□30B□1-20P1	91	122.9	High inertia

■ 60 series motor installation dimension Unit: mm

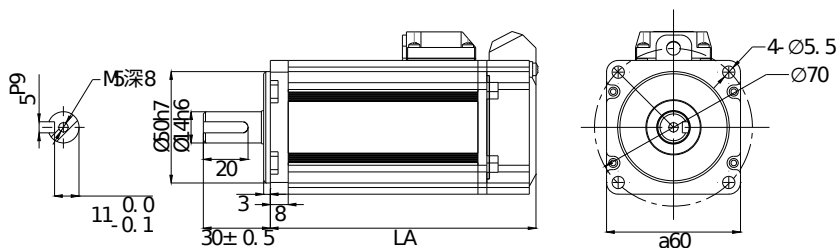
◆ MS5 motor



Motor model	LA \pm 1		Inertia level
	Normal	With brake	
MS5S-60STE-C□00630□□-20P2-S01/S02	79	114	Low inertia
MS5S-60STE-C□01330□□-20P4-S01/S02	99	134	
MS5H-60STE-C□00630□□-20P2-S01/S02	91	126	High inertia

MS5H-60STE-C□01330□□-20P4-S01/S02	111	146	
MS-60STE-T01330-20P4-D01	145	189	-

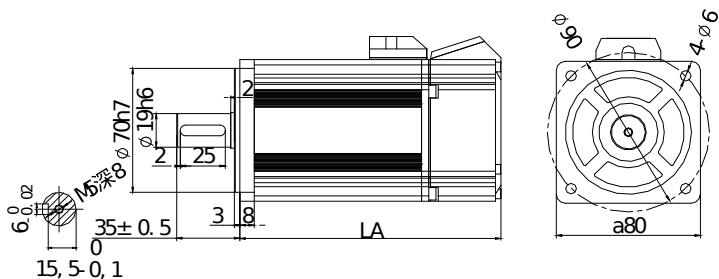
◆ MS6 motor



Motor model	LA \pm 1		Inertia level
	Normal	With brake	
MS6H-60C□301B□□-20P4	119	151	High inertia
MS6S-60C□301B□□-20P4	107	139	Low inertia
MS6H-60C□301B□□-20P2	90	121	High inertia

■ 80 series motor installation dimension Unit: mm

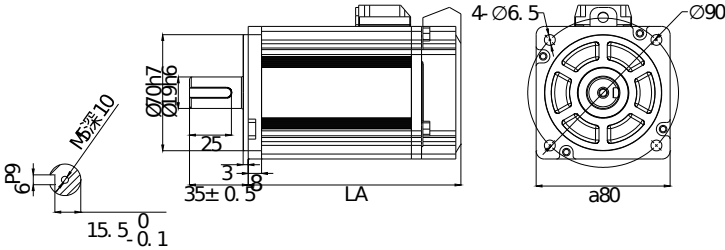
◆ MS5 motor



Motor model	LA \pm 1		Inertia level
	Normal	With brake	
MS5S-80STE-C□02430□□-20P7-S01/S02	107	144	Low inertia
MS5S-80STE-C□03230□□-21P0-S01/S02	128	165	
MS5H-80STE-C□02430□□-20P7-S01/S02	119	156	High inertia
MS5H-80STE-C□03230□□-21P0-S01/S02	140	177	

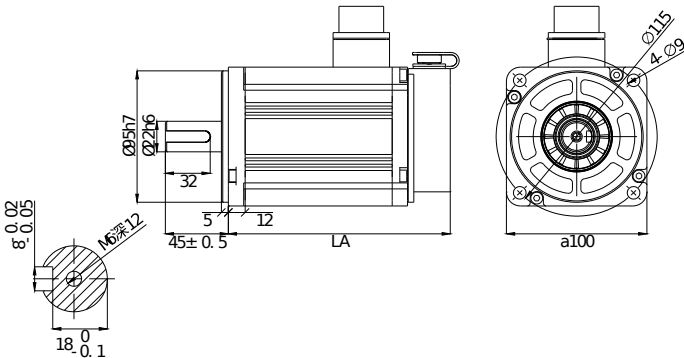
MS-80ST-T02430□□-20P7	150	199	-
MS-80ST-T03520□□-20P7	179	219	

◆ MS6 motor



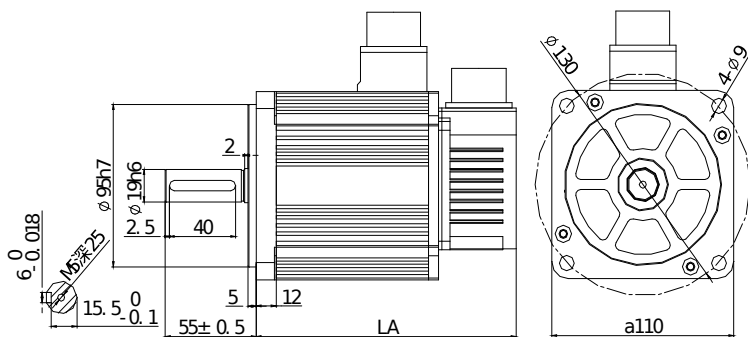
Motor model	LA ± 1		Inertia level
	Normal	With brake	
MS6S-80C□30B□□-20P7	117	150	Low inertia
MS6S-80C□20B□□-20P7	127	160	
MS6H-80C□30B□□-20P7	124	157	High inertia
MS6H-80C□20B□□-20P7	149	182	

■ 100 series motor installation dimension Unit: mm



Motor model	LA ± 1		Inertia level
	Normal	With brake	
MS6S-100C□30B2-21P5	158.5	-	Low inertia

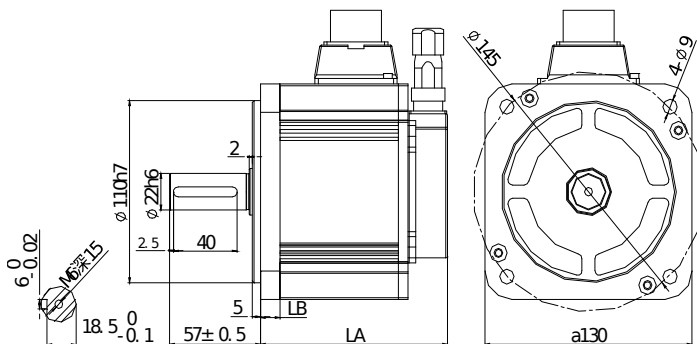
■ 110 series motor installation dimension Unit: mm



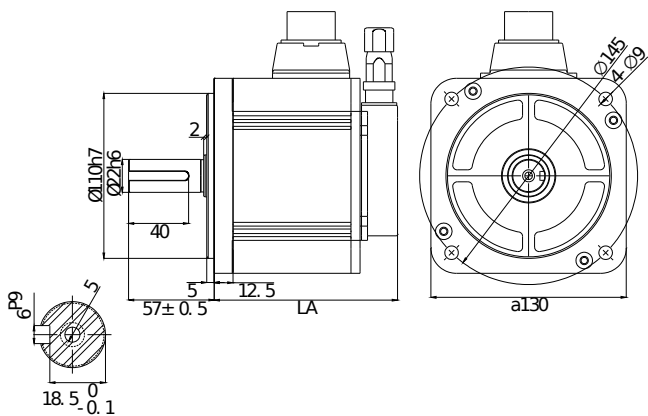
Motor model	LA±1		Inertia level
	Normal	With brake	
MS55-110ST-C□03230□-21P0-S01	157	205	Low inertia
MS55-110ST-TL03230□-21P0-S01	157	205	
MS55-110ST-C□04830□-21P5-S01	166	214	
MS55-110ST-TL04830□-21P5-S01	166	214	
MS55-110ST-C□06030□-21P8-S01	181	229	
MS-110ST-TL06030□-21P8-S01	181	229	-
MS-110ST-T04030B-21P2	157	205	
MS-110ST-T05030B-21P5	166	214	

■ 130 series motor installation dimension Unit: mm

◆ MS5 motor

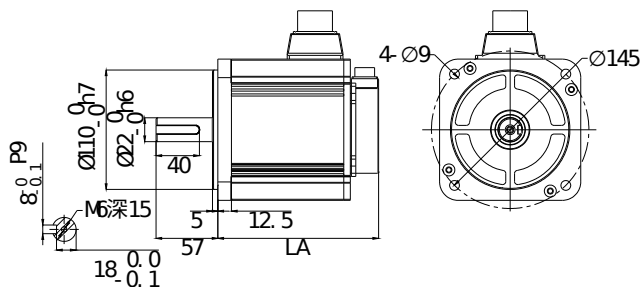


Motor model	LA±1		LB	Inertia level
	Normal	With brake		
MS5G-130STE-C□05415□□-20P8-S01	117.5	147	12.5	Medium inertia
MS5G-130STE-TL05415□□-20P8-S01	134.5	164.5		
MS5G-130STE-C□07220□□-21P5-S01	132.5	162.5		
MS5G-130STE-C□07220□□-41P5-S01	132.5	162.5		
MS5G-130STE-TL07220□□-21P5-S01	149.5	179.5		
MS5G-130STE-TL07220□□-41P5-S01	149.5	179.5		
MS5G-130STE-C□11515□□-21P8-S01	159.5	189.5		
MS5G-130STE-C□11515□□-41P8-S01	159.5	189.5		
MS5G-130STE-TL11515□□-21P8-S01	176.5	206.5		
MS5G-130STE-TL11515□□-41P8-S01	176.5	206.5		
MS5G-130STE-C□14615□□-22P3-S01	180.5	210.5		
MS5G-130STE-C□14615□□-42P3-S01	180.5	210.5		
MS5G-130STE-TL14615□□-22P3-S01	197.5	227.5		
MS5G-130STE-TL14615□□-42P3-S01	197.5	227.5		
MS5G-130STE-C□07330□□-22P4-S01	132.5	162.5		
MS5G-130STE-TL07330□□-22P4-S01	149.5	179.5		
MS5G-130STE-C□10025□□-22P6-S01	159.5	189.5		
MS-130ST-T10015□□-21P5	205	264	14	-
MS-130STE-T07730□□-22P4	205	264		
MS-130ST-T10025□□-22P6	209	290		
MS-130ST-TL10030□□-43P0	225	284	15	-



Motor model	LA±1		Inertia level
	Normal	With brake	
MS5G-130STE-□□06025B□-21P5-S01	122	153.5	Medium inertia
MS5G-130STE-□□10015B□-21P5-S01	145	176.5	

◆ MS6 motor

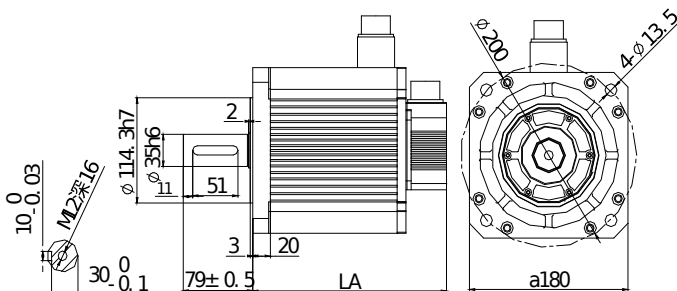


Motor model	LA±1		Inertia level
	Normal	With brake	
MS6H-130C□15B□2-20P8	126	156	High inertia
MS6H-130C□15B□2-40P8	126	156	
MS6H-130TL15B□2-20P8	142	172	
MS6H-130TL15B□2-40P8	142	172	
MS6H-130C□15B□2-41P3	148	178	
MS6H-130TL15B□2-41P3	164	194	

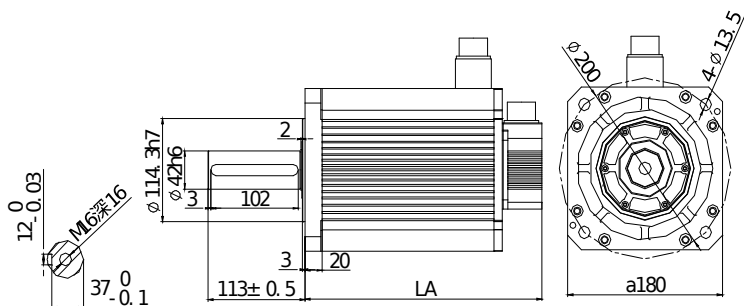
Motor model	LA±1		Inertia level
	Normal	With brake	
MS6H-130C□20B□2-21P5	148	178	
MS6H-130TL20B□2-21P5	164	194	
MS6H-130C□15B□2-21P8	175	205	
MS6H-130C□15B□2-41P8	175	205	
MS6H-130TL15B□2-21P8	191	221	
MS6H-130TL15B□2-41P8	191	221	
MS6H-130C□15B□2-22P3	195.6	225.6	
MS6H-130C□15B□2-42P3	195.6	225.6	
MS6H-130TL15B□2-22P3	211.6	241.6	
MS6H-130TL15B□2-42P3	211.6	241.6	

■ 180 series motor installation dimension Unit: mm

◆ MS5 motor

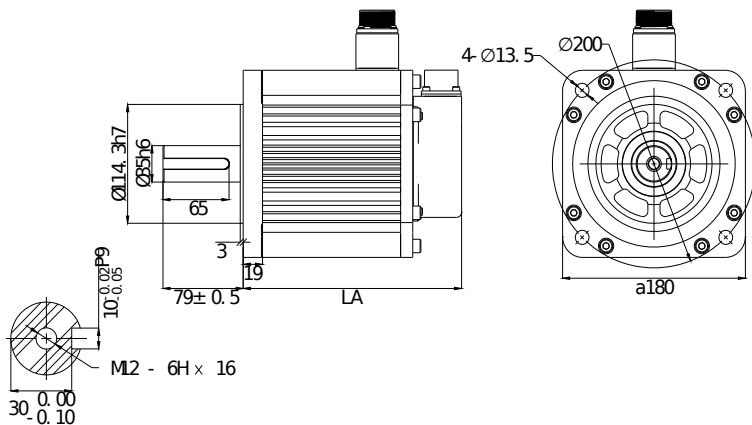


Motor model	LA±1		Inertia level
	Normal	With brake	
MS5G-180ST-TL19015□□-42P9-S01	221	303	Medium inertia
MS5G-180ST-TL28015□□-44P4-S01	247	329	

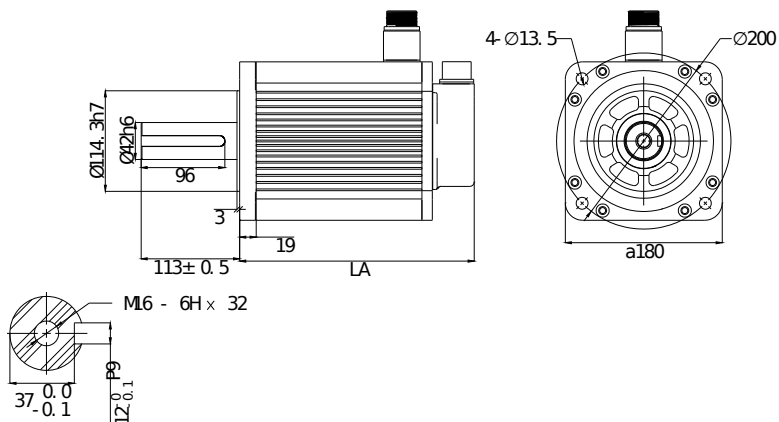


Motor model	LA±1		Inertia level
	Normal	With brake	
MS5G-180ST-TL35015□□-45P5-S01	277	359	Medium
MS5G-180ST-TL48015□□-47P5-S01	318	400	inertia

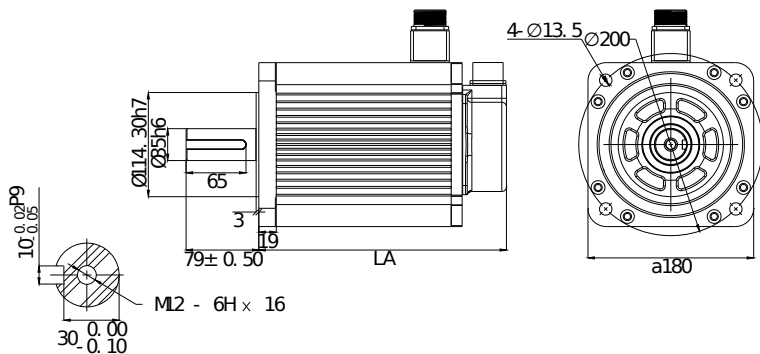
◆ MS6 motor



Motor model	LA±1		Inertia level
	Normal	With brake	
MS6H-180C□15B□2-43P0	215	255	High inertia
MS6H-180TL15B□2-43P0	215	255	
MS6H-180C□15B□2-44P4	247	287	
MS6H-180TL15B□2-44P4	247	287	

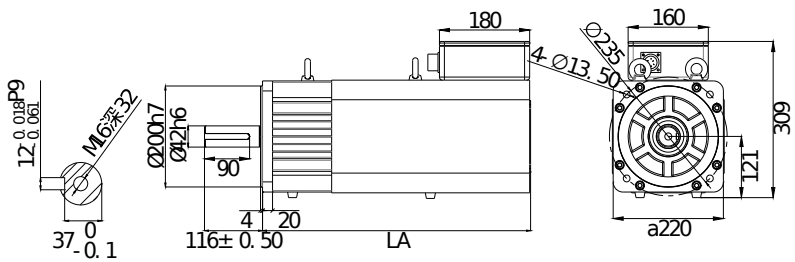


Motor model	LA \pm 1		Inertia level
	Normal	With brake	
MS6H-180C□15B□2-45P5	269	309	High inertia
MS6H-180TL15B□2-45P5	269	309	
MS6H-180C□15B□2-47P5	325	365	
MS6H-180TL15B□2-47P5	325	365	



Motor model	LA \pm 1		Inertia level
	Normal	With brake	
MS6H-180CS/CM15E□2-45P5	269	309	High inertia
MS6H-180CS/CM15E□2-47P5	325	365	

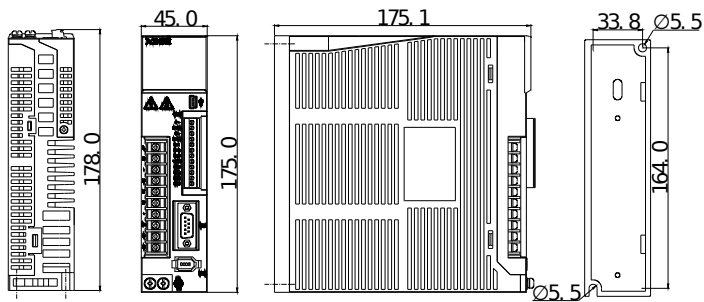
■ 220 series motor installation dimension Unit: mm



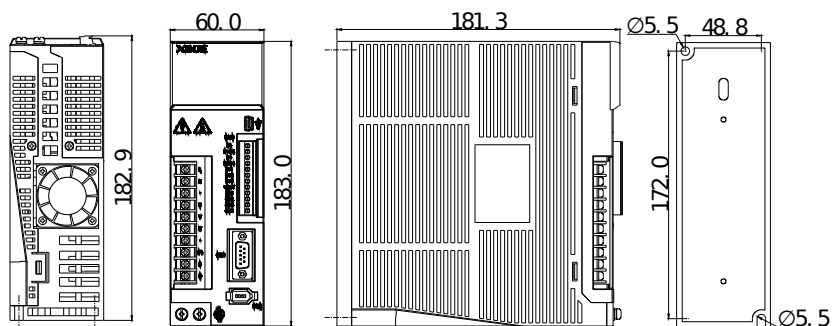
Motor model	LA±1		Inertia level
	Normal	With brake	
MS-220STE-TL70015B-411P0-XJ	454	-	-
MS-220STE-TL96015B-415P0-XJ	507	-	
MS5G-220STE-□□40015B-422P0-S01	535	-	Medium inertia

2-4. Servo driver dimension

■ DS5E/L-20P1-PTA, DS5E/L-20P2-PTA, DS5E/L-20P4-PTA Unit: mm

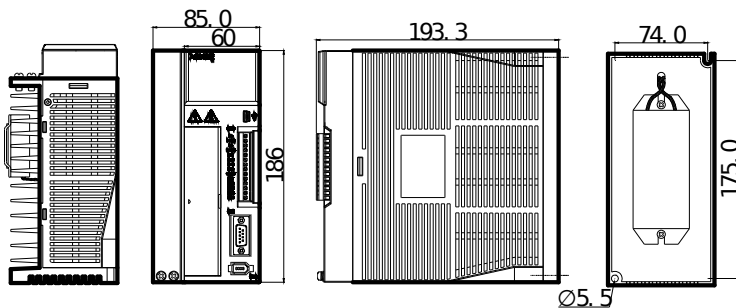


■ DS5E/L-20P7-PTA Unit: mm



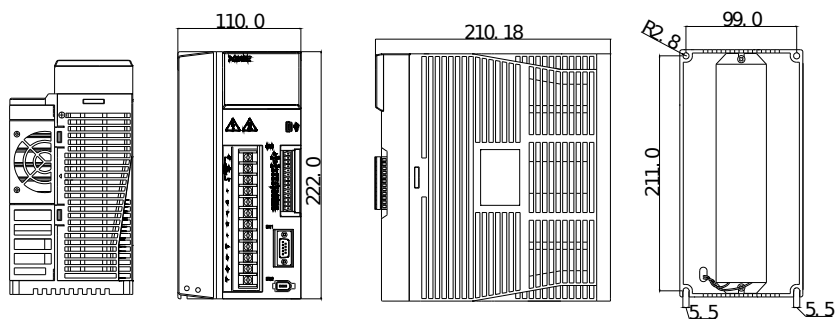
- DS5E/L-21P0-PTA, DS5E/L-21P5-PTA, DS5E/L-22P3-PTA, DS5E/L-22P6-PTA, DS5E-41P0-PTA, DS5E-41P5-PTA

Unit: mm



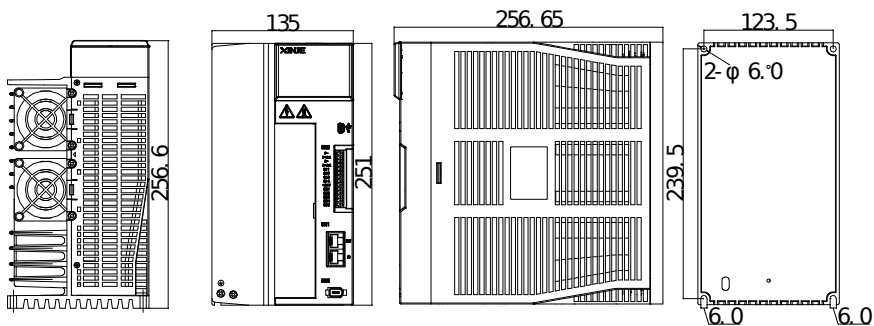
- DS5E-43P0-PTA (-H)

Unit: mm



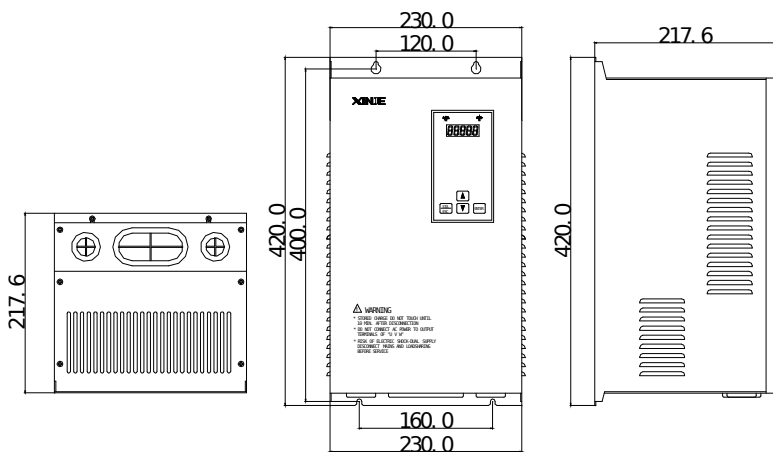
- DS5E-45P5-PTA (-H) , DS5E-47P5-PTA (-H)

Unit: mm



■ DS5E-411P0-PTA, DS5E-415P0-PTA

Unit: mm



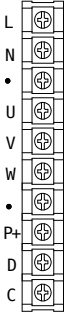
■ DS5E-422P0-PTA

Unit: mm

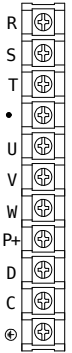
3.Servo driver wiring

3-1.Main circuit terminals explanation


■ DS5E/L-20P1/20P2/20P4/20P7-PTA

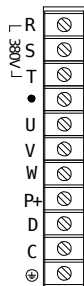


Terminal	Function	Explanation
L/N	Power supply input of main circuit	Single phase AC 200~240V, 50/60Hz
•	Vacant terminal	-
U, V, W	Motor terminals	Connect the motor Note: the ground wire is on the cooling fin, please check it before power on!
P+, D, C	Internal regenerative resistor	Short P+ and D, disconnect P+ and C
	External regenerative resistor	Connect regenerative resistor between P+ and C, disconnect P+ and D, P0-25= power value, P0-26= resistor value



■ DS5E/L-21P0/21P5/22P3/22P6-PTA

Terminal	Function	Explanation
R/S/T	Power supply input of main circuit	Single/3-phase AC 200~240V, 50/60Hz
•	Vacant terminal	-
U, V, W	Motor terminals	Connect the motor Note: the ground wire is on the cooling fin, please check it before power on!
P+, D, C	Internal regenerative resistor	Short P+ and D, disconnect P+ and C
	External regenerative resistor	Connect regenerative resistor between P+ and C, disconnect P+ and D, P0-25= power value, P0-26= resistor value
	Ground terminal	Connect to ground terminal of motor, then connect to the ground



■ DS5E-41P5-PTA

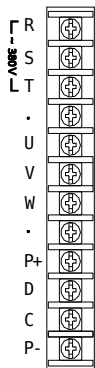
Terminal	Function	Explanation
R/S/T	Power supply input of main circuit	3-phase AC 380~440V, 50/60Hz
•	Vacant terminal	-
U, V, W	Motor terminals	Connect the motor Note: the ground wire is on the cooling fin, please check it before power on!
P+, D, C	Internal regenerative resistor	Short P+ and D, disconnect P+ and C
	External regenerative resistor	Connect regenerative resistor between P+ and C, disconnect P+ and D, P0-25= power value, P0-26= resistor value
	Power supply input of main circuit	Connect to ground terminal of motor, then connect to the ground



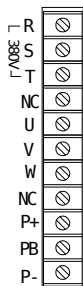
■ DS5E-41P0-PTA

Terminal	Function	Explanation
R, S, T	Power supply input of main circuit	3-phase AC 380~440V, 50/60Hz
U, V, W	Motor terminals	Connect the motor Note: the ground wire is on the cooling fin, please check it before power on!
P+, D, C	Internal regenerative resistor	Short P+ and D, disconnect P+ and C
	External regenerative resistor	Connect regenerative resistor between P+ and C, disconnect P+ and D, P0-25= power value, P0-26= resistor value
P+, P-	Grounding terminal	Connect to ground terminal of motor, then connect to the ground

■ DS5E-43P0-PTA, DS5E-43P0-PTA-H



Terminal	Function	Explanation
R/S/T	Power supply input of main circuit	3-phase AC 380~440V, 50/60Hz
NC	Vacant terminal	-
U, V, W	Motor terminals	Connect the motor Note: the ground wire is on the cooling fin, please check it before power on!
P+, D, C	External regenerative resistor	Connect regenerative resistor between P+ and C, disconnect P+ and D, P0-25= power value, P0-26= resistor value
	Internal regenerative resistor	Short P+ and D, disconnect P+ and C, set P0-24=0
P+, P-	Bus terminal	Real-time bus voltage can be measured. Please pay attention to the danger.

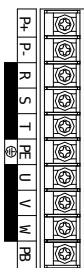


■ DS5E-45P5/47P5-PTA, DS5E-45P5/47P5-PTA-H

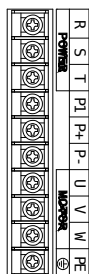
Terminal	Function	Explanation
R/S/T	Power supply input of main circuit	3-phase AC 380~440V, 50/60Hz
NC	Vacant terminal	-
U, V, W	Motor terminals	Connect the motor Note: the ground wire is on the cooling fin, please check it before power on!
P+, PB	External regenerative resistor	Connect regenerative resistor between P+ and PB, P0-25= power value, P0-26= resistor value
P+, P-	Bus terminal	Real-time bus voltage can be measured. Please pay attention to the danger.

■ DS5E-411P0/415P0-PTA

Terminal	Function	Explanation
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R/S/T	Power supply input of main circuit	3-phase AC 380~440V, 50/60Hz
PE	Connect to ground	-
U, V, W	Motor terminals	Connect the motor Note: the ground wire is on the cooling fin, please check it before power on!
P+, PB	External regenerative resistor	Connect regenerative resistor between P+ and PB, P0-25= power value, P0-26= resistor value
P+, P-	Bus terminal	Real-time bus voltage can be measured. Please pay attention to the danger.




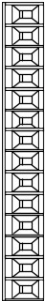
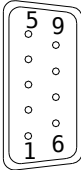
■ DS5E-422P0-PTA

Terminal	Function	Explanation
R, S, T	Power supply input of main circuit	3-phase AC 380~440V, 50/60Hz
PE	Connect to the ground	-
U, V, W	Motor terminals	Connect the motor Note: the ground wire is on the cooling fin, please check it before power on!
P1, P+, P-	P1, P-: external brake unit	It is necessary to select the braking unit and braking resistance. The input terminal of the braking unit is connected to P1 and P -, and the braking resistance is connected to the output of the braking unit
	P1, P+: the terminals are short connected	After removing the short connector, the DC reactor can be connected in series to suppress the high-order harmonic of the power supply and improve the output DC waveform
	P+, P-: bus terminal	The real-time voltage of the bus can be measured. Please pay attention to the danger.

3-2. Control terminal explanation and wiring

The numbers of the following connectors are in the order when looking at the solder patch.

3-2-1.DS5E/L series control terminals

CN0		CN1
Below 1.5KW	1.5KW and up	
 P- P+24V D- D+24V SI 1 SI 2 SI 3 +24V SO1 SO2 SO3 COM	 P- P+24V D- D+24V SI 1 SI 2 SI 3 SI 4 +24V SO1 SO2 SO3 SO4 COM	 5 9 ○ ○ ○ ○ ○ ○ ○ ○ 1 6

■ CN0 terminal explanation (below 1.5KW, 3 inputs, 3 outputs)

No.	Name	Explanation	No.	Name	Explanation
1	P-	Pulse input PUL-	7	SI3	Input terminal 3
2	P+24V	Open collector input	8	+24V	Input +24V
3	D-	Direction input DIR-	9	SO1	Output terminal 1
4	D+24V	Open collector input	10	SO2	Output terminal 2
5	SI1	Input terminal 1	11	SO3	Output terminal 3
6	SI2	Input terminal 2	12	COM	Output terminal ground

■ CN0 terminal description (above 1.5KW, 4 inputs, 4 outputs)

No.	Name	Explanation	No.	Name	Explanation
1	P-	Pulse input PUL-	8	SI4	Input terminal 4
2	P+24V	Open collector input	9	+24V	Input +24V
3	D-	Direction input DIR-	10	SO1	Output terminal 1
4	D+24V	Open collector input	11	SO2	Output terminal 2
5	SI1	Input terminal 1	12	SO3	Output terminal 3
6	SI2	Input terminal 2	13	SO4	Output terminal 4

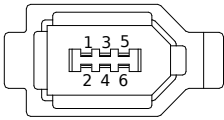
7	SI3	Input terminal 3	14	COM	Output terminal ground
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■ CN1 terminal explanation (5L series CN1 terminals have no definition)

No.	Name	Explanation	No.	Name	Explanation
1	GND	GND-485	2	A1	RS485+
3	B1	RS485-	4	A2	RS485+
5	B2	RS485-	6	GND	GND-485
7	NC	Reserved	8	NC	Reserved
9	NC	Reserved	9	NC	Reserved

■ CN2 terminal explanation

The terminals of the CN2 connector are arranged as follows (faced solder plates):



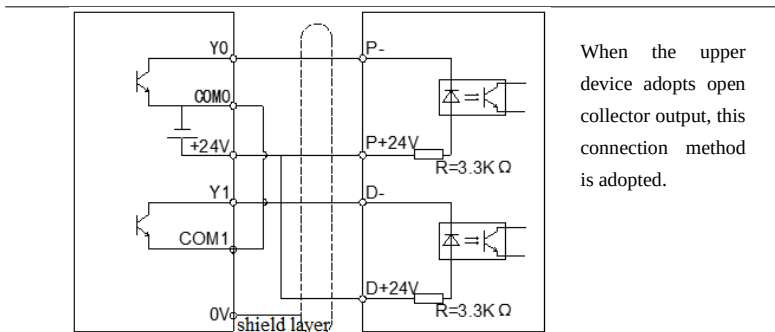
No.	Definition
1	5V
2	GND
5	485-A
6	485-B

3-2-2.DS5E/L series control terminal wiring

■ Pulse input signal

The interface circuit of open collector / differential signal pulse input, and the wiring diagram is as follows:

Open collector (24V)	
PLC, CNC and SCM	servo driver



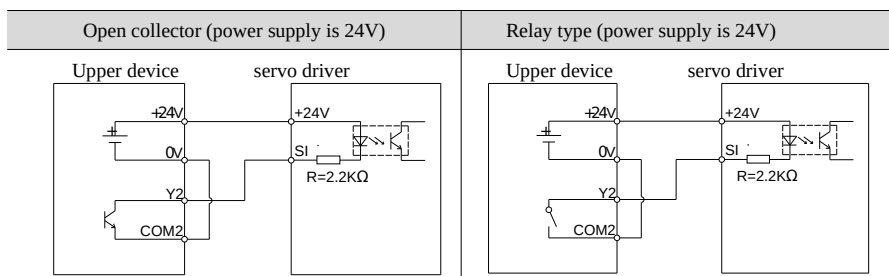
■ SI input signal

Use relay or transistor circuit with open collector to connect. When using relay connection, please select relay for small current. If the relay for small current is not used, it will cause poor contact.

Type	Input terminal	Function
Digital input	SI1~SI3 (750w and below models)	Multifunctional input signal terminal
	SI1~SI4 (above 750w models)	

Default settings of input terminals:

Terminal	SI1	SI2	SI3	SI4 (above 750W models can support)
Function	S-ON/enable	ALM-RST/alarm reset	P-OT/forward prohibition	N-OT/reverse prohibition



Note:

The maximum allowable voltage and current of the collector open circuit output circuit are as follows:

Voltage: DC 30V (maximum)

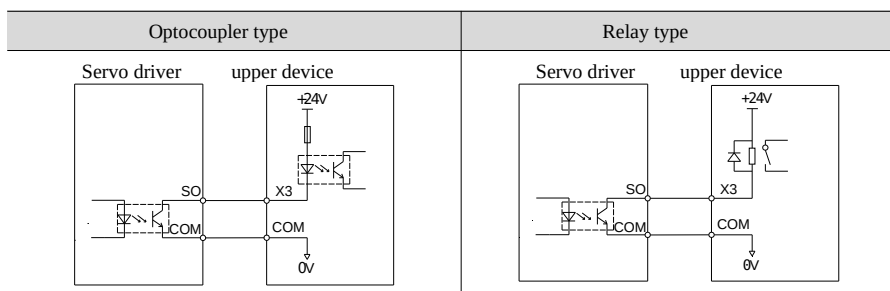
Current: DC 50mA (maximum)

■ SO output signal

Type	Output terminal	Function
Digital output	SO1~SO3 (750W and below)	Multifunctional output terminal
	SO1~SO4 (above 750W)	

The default settings of output terminals:

Terminal	SO1	SO2	SO3~SO4
Function	COIN/positioning completion	ALM/alarm	Not distribute



Note:

The maximum allowable voltage and current capacity of open collector output circuit are as follows:

Voltage: DC 30V (maximum)

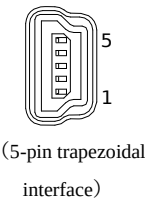
Current: SO1 DC 500mA (max)

SO (other) DC 50mA (max)

3-3.Communication port

■ RS-232 communication

It is generally connected with the computer for the debugging of the upper computer.



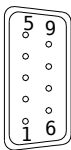
Pin	Name	Explanation
1	TXD	RS232 send
2	RXD	RS232 receive
3	GND	RS232 signal ground

RS232 port default communication parameters: baud rate 19200bps, data bit is 8-bit, stop bit is 1-bit, even parity.

Note: please use the special cable provided by Xinje company for communication.

■ RS-485 communication

DS5E series



CN1 port: the definition on the driver side

Pin	Name
CN1-2	A1
CN1-3	B1
CN1-4	A2
CN1-5	B2

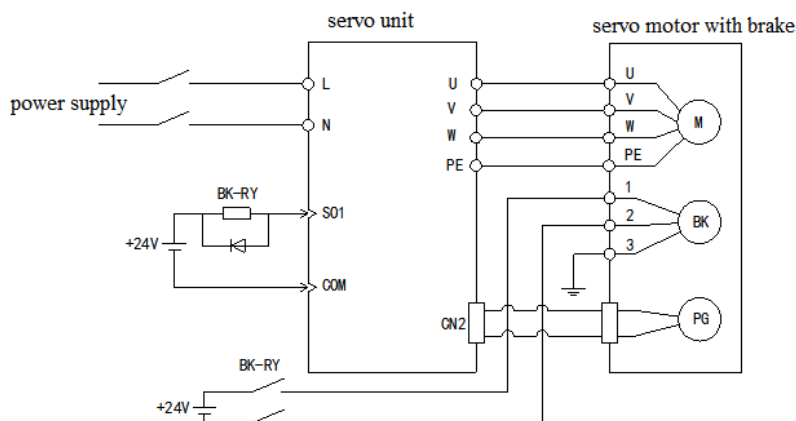
Note: the servo motion bus function requires optional bus module, which is inserted into the driver CN1 port to realize the extended bus function. Note that the transfer module cannot be hot swapped in use. It is recommended to use PROFIBUS standard connecting wire in order to achieve the best communication reliability.

The default communication parameter of RS485 is: baud rate 19200bps; 8 data bits; Stop bit: 1 bit; even Parity check; Modbus station number 1.

3-4.Power loss brake (BK)

3-4-1.Wiring example

The sequential output signal "/BK" and "brake power supply" of the servo unit constitute the on / off circuit of the brake. Typical connection examples are shown below.



Note:

- (1) The voltage of the brake is 24V.
- (2) In the above figure, BK signal is output by SO1, and parameter P5-44 should be set to n.0001. If it is output from SO2, P5-44 should be set to n.0002.
- (3) If the holding brake current is more than 50mA, please transfer it through relay to prevent burning the terminal due to excessive current.

3-4-2.Brake signal

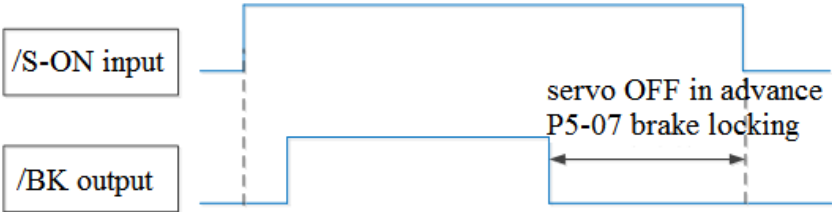
Parameter	Signal name	Type	Default setting	Meaning	Modification
P5-44	/BK	Output	n.0000	Unassigned output signal terminal	The parameter range 0000-0014 is assigned to the output interface through parameter P5-44. When set to 0001, it indicates that a signal is output from SO1 terminal.

3-4-3.Switch time between BK and SON signal

Due to the action delay time of the brake, the machinery moves slightly under the action of gravity, etc. P5-07

parameter is used for time adjustment.

P5-07	Servo OFF delay time (brake command)						
	Unit	Default setting	Range	Suitable mode	Meaning	modify	Effective
	1ms	500	0~65535 - 500~9999 (after version 3760)	All the mode	After enable is on, release the holding brake after delaying this time; When the enable off signal is true, the lock brake will be locked, and the enable will be off after delaying the time.	servo bb	At once



(1) When P5-07 is set to "+": after the driver is powered down, save the parameters with the capacitance power,

(2) When P5-07 is set to "-":

- ① The setting of negative value is only effective under the distribution of holding brake terminal;
- ② When the power loss signal occurs, turn off the brake directly. At this time, the power stored in the capacitor needs to be consumed. Turn off the enable after delaying the time of P5-07. However, if the capacitor power is maintained enabled, the power will be consumed quickly, and there is a risk of losing parameters. Please use it with caution!

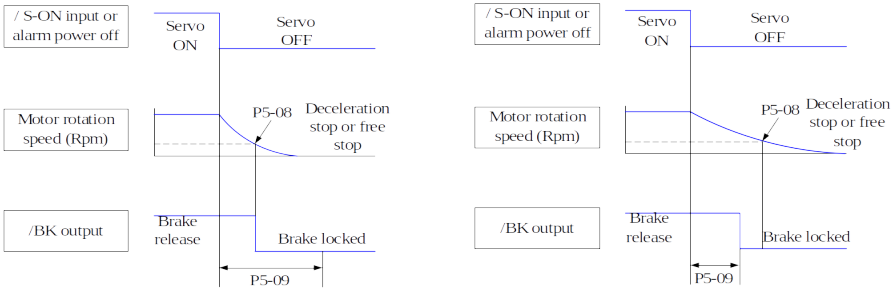
3-4-4. Brake closing parameter setting

When the alarm occurs, the motor quickly becomes non energized. Due to gravity or inertia, the machine will move within the time until the brake acts.

P5-08	Brake command output speed					
	Unit	Default setting	Setting range	Suitable mode	Modify	effective

	Rpm	30	0~10000	All the modes	Servo bb	At once
P5-09	Brake command waiting time					
	Unit	Default setting	Setting range	Suitable mode	Modify	effective
	1ms	500	0~65535	All the modes	Servo bb	At once

When the servo motor with brake is off due to the disappearance of input signal "/ S-ON" during motor rotation or the occurrence of alarm, the braking time can be set.



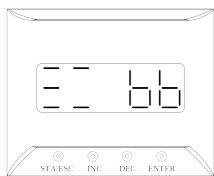
Since the brake of the servo motor is designed as position holding, it must be activated at the appropriate time when the motor stops. While observing the action of the machine, adjust the user parameters.

The conditions under which the / BK signal changes from on to off during motor rotation are as follows (any of the two conditions takes effect):

- (1) When the speed of the motor is below the set value of P5-08 after the servo is off;
- (2) When the set time of P5-09 is exceeded after the servo is off.

4. Before using operation of servo system

4-1. Operate panel display and operate introduction



button	Operation
STA/ESC	Short press: state switch, state return
INC	Short Press: The display data increases
	Long press: The display data increases continuously
DEC	Short Press: The display data decreases
	Long press: The display data decreases continuously
ENTER	Short press: shift;
	Long press: Set and view parameters.

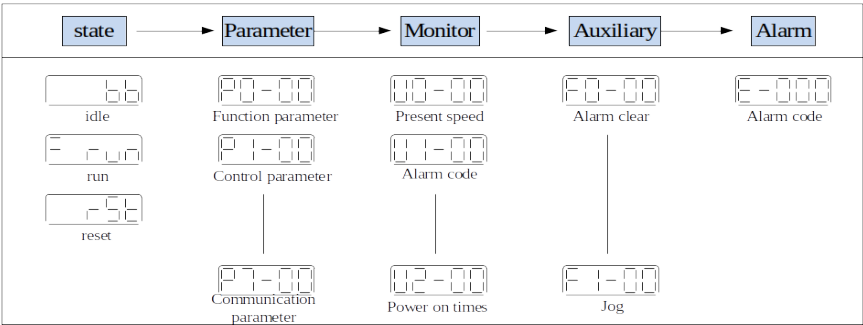
Note: after power on, the panel will conduct self-test operation, and all display nixie tubes and five decimal points will light up for 1 second at the same time.

By switching the basic state of the panel operator, the operation state display, parameter setting, auxiliary function operation command and other operations can be carried out.

After pressing the STA / ESC key, the States will be switched in the order shown in the figure below.

Status: BB indicates that the servo system is idle; Run indicates that the servo system is running and RST indicates that the servo needs to be powered on again.

STA/ESC switch



- Parametric setting Px-xx: The first X represents the group number, and the last two X represents the parameter serial number under the group.
- Monitor status Ux-xx: The first X represents the group number, and the last two X represents the

parameter number under the group.

- Auxiliary function Fx-xx: The first X denotes the group number, and the last two X denotes the parameter number under the group.
- Alarm state E-xxx: The first two X denote the alarm category, and the last x denotes the small category under the category.

Take modifying P3-09 as an example:

Step	Display	Use buttons	Operation
1		STA/ESC INC DEC ENTER 	No operation
2		STA/ESC INC DEC ENTER 	Press STA/ESC to enter parameter setting
3		STA/ESC INC DEC ENTER 	Press INC to increase by 1, press 3 times to add to 3, it shows P3-00
4		STA/ESC INC DEC ENTER 	Press ENTER, the last "0" will flash
5		STA/ESC INC DEC ENTER 	Press INC to increase to 9
6		STA/ESC INC DEC ENTER 	Long press ENTER to enter P3-09
7		STA/ESC INC DEC ENTER 	Press INC, DEC, ENTER to increase/decrease and shift bit, after changing, long press ENTER to confirm
8	END		

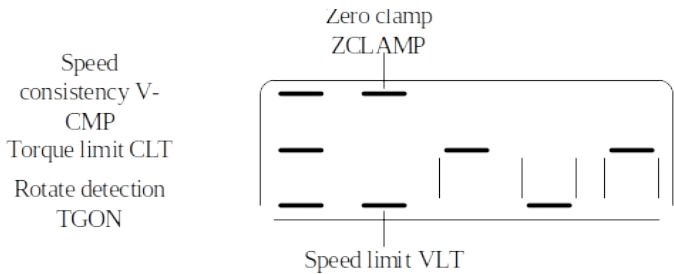
4-1-1.Operation display status explanation

When powered on, the panel display is set according to P8-25 parameters (supported by 3770 version and later).

Parameter	Name	Default setting	Suitable mode	Meaning	Modify	effective
P8-25	Panel display	0	All	0: normal display, power on display 'BB' or 'run'	Anytime	Power on

	y setting		<p>1: Power on the panel to display the value of U0-00, speed feedback, unit: RPM</p> <p>2: Power on the panel to display the value of U0-07, torque feedback, unit %</p>		again
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■ Speed torque control mode



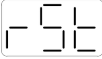
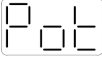




1. Digit display contents

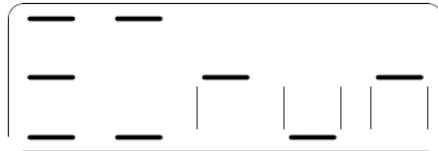
Digit data	Display contents
P5-39 Same speed detection (/V-CMP)	When the actual speed of the motor is the same as the command speed, turn on the light. Detection Width of Same Speed Signal: P5-04 (Unit: rpm)
P5-42 Torque limit (/CLT)	When the speed is controlled, when the torque exceeds the set value, turn on the light. Internal Forward Torque Limitation: P3-28 Internal Reverse Torque Limitation of: P3-29
P5-40 Rotate detection (/TGON)	P5-03 (Unit: rpm) When the motor speed is higher than the rotating speed, turn on the lamp. Rotation detection speed: P5-03 (unit: rpm)
P5-31 Zero clamp (/ZCLAMP)	When the zero clamp signal starts to operate, turn on the light.

P5-43 Speed limit (/VLT)	When the speed exceeds the set value, turn on the light when the torque is controlled. Forward speed limit in torque control: P3-16; reverse speed limit: P3-17.
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2. Short code display content

Short code	Display contents
	Standby status Servo OFF status. (The motor is in a non-electrified state)
	In operation Servo enabling state. (The motor is on-line)
	Need reset status Servo needs to be re-energized
	Forbidden forward drive state P-OT ON status. Refer to Section 5.2.4, "Overrun Prevention".
	Forbidden reversal drive state N-OT ON status. Refer to Section 5.2.4, "Overrun Prevention".
	Control mode 2 is vacant.

- Position control mode
- Positioning completion COIN
- Positioning near NEAR
- Rotate detection TGON



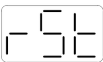
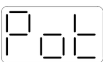
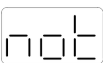



1. Digit display content

Digit data	Display contents
P5-38 Positioning completion (/COIN)	In position control, when the given position is the same as the actual position, turn on the light. Location Completion Width: P5-00 (Unit: Instruction Pulse)
P5-36 Near (/NEAR)	In position control, when the given position is the same as the actual position, turn on the light.

Digit data	Display contents
	Near signal width: P5-06
P5-40	When the motor speed is higher than the rotating speed, turn on the lamp.
Rotate detection (/TGON)	Rotation detection speed: P5-03 (unit: rpm)

2. short code display content

Short code	Display contents
	Standby status Servo OFF status. (The motor is in a non-electrified state)
	In operation Servo enabling state. (The motor is on-line)
	Need reset status Servo needs to be re-energized
	Forbidden forward drive state P-OT ON status. Refer to Section 5.2.4, "Overrun Prevention".
	Forbidden reversal drive state N-OT ON status. Refer to Section 5.2.4, "Overrun Prevention".
	Control mode 2 is vacant.

4-2.Servo parameters

4-2-1.PX-XX parameters

See Appendix parameters for details.

4-2-2.UX-XX monitoring parameters

See Appendix parameters for details.

4-2-3.FX-XX auxiliary function parameters

■ F0-XX

Function code	Explanation
F0-00	Alarm clear

F0-01	Resume to default settings
F0-02	Clear the position offset
F0-07	Panel inertia identification
F0-08	Panel external instruction auto-tuning
F0-09	Panel internal instruction auto-tuning
F0-10	Panel vibration suppression 1
F0-11	Panel vibration suppression 2
F0-12	Fast FFT for panel vibration suppression

1. Clear alarm (parameter F0-00)

In case of failure, it will automatically jump out of the alarm state of E-xxx and display the alarm number. In case of no failure, the alarm state will not be visible. In the alarm state, write 1 to F0-00 through panel operation to reset the fault.

In case of servo alarm due to servo power off, it is not necessary to clear the alarm. When an alarm occurs, first eliminate the cause of the alarm, and then clear the alarm.

2. Restore the parameter to the factory value (parameter F0-01)

First turn the servo off, and then restore the factory operation. The operation is as follows:

Set F0-01 = 1, press enter to confirm, then the parameter recovery has been completed, and there is no need to power off again.

3. Clear deviation (parameter F0-02)

Set F0-02 = 1 to clear the deviation.

4. Clear historical alarm record (F0-04)

Set F0-04 = 1 to clear the historical alarm records U1-14 ~ U1-53.

5. Panel inertia identification (parameter F0-07)

Before inertia identification, please use F1-00 jog function to confirm the servo rotation direction. At the beginning of inertia identification, Inc or Dec determines the initial direction of servo operation!

If the servo jitters under the adaptive default parameters, please switch to the adaptive large inertia mode (P2-03.3 = 1) to ensure the stable operation of the servo before inertia identification!

When the servo is in BB state, enter the parameter F0-07 display:



6. Panel external command self-tuning (parameter F0-08)

Refer to section 5-2-1 for detailed steps.

7. Panel internal command self-tuning (parameter F0-09)

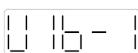
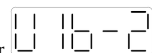
Refer to section 5-2-2 for detailed steps.

8. Panel vibration suppression (parameters F0-10, F0-11)

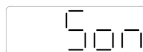
Vibration suppression mode	Display	Changed parameters
Mode 1	vib-1	Only the parameters related to vibration suppression will be changed
Mode 2	Vib-2	The parameters related to vibration suppression and the gain of speed loop will be changed

The operation steps are described below:

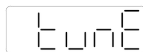
- (1) In the self-tuning mode, enter the parameter F0-10 and the panel displays vib-1 or enter F0-11 and the panel displays vib-2;

 or 

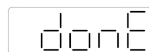
- (2) Briefly press the Enter key, and the panel displays Son and flashes. At this time, it needs to be enabled manually;



- (3) After the servo enable is turned on, the panel displays tune and flashes to enter the setting state;



- (4) The upper device starts to send pulse command until done is displayed and flashes to complete vibration suppression;



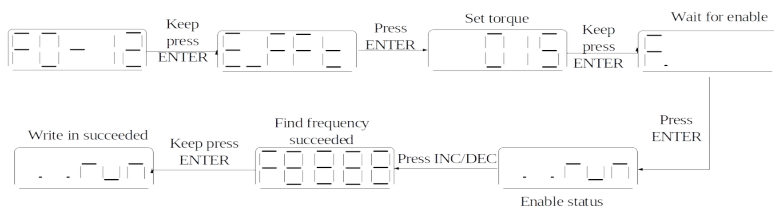
- (5) Short press STA / ESC to exit;

The vibration suppression parameters will be automatically written into the second and first notch filters (when there is only one vibration point, the second notch will be opened first). See the user manual for relevant parameters.

9. Panel vibration suppression (fast FFT) (F0-12)

This function can be used to analyze the mechanical characteristics through F0-12 parameters on the servo operation panel, find out the mechanical resonance frequency and achieve vibration suppression.

The steps are as following:



■ F1-XX

Function code	Explanation
F1-00	Jog run
F1-01	Test run
F1-02	Current Sampling Zero-correction
F1-05	Forced enable
F1-06	Reset turns of absolute encoder

1. Jog operation (F1-00)

Before entering inching mode, please confirm that the motor shaft is not connected to the machine and the driver is BB idle!

During inching operation, parameters such as gain will participate in the control, and whether the parameter setting is appropriate can be judged according to the operation condition.



P3-18	JOG speed					
	Unit	Default setting	Setting range	Suitable mode	Modify	Effective
	1rpm	100	0~1000	JOG	Servo OFF	At once

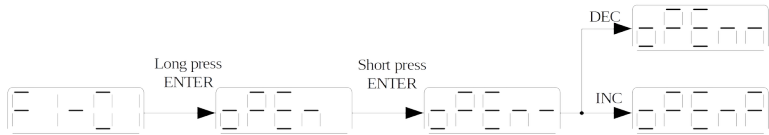
2. Test run (F1-01)

Before entering the test run mode, please confirm that the motor shaft is not connected to the machine!

When the servo driver is connected to the non-original encoder or power cable, it should first enter the test run mode to verify that the encoder terminal or power terminal is connected correctly.

Test run mainly checks the power cable and the encoder feedback cable to determine whether the connection is normal. According to the following operation, the motor can normally achieve forward and reverse rotation. If the motor shaft shakes or driver alarms, please immediately disconnect the power supply, and re-check the

wiring situation.



3. Current sampling zero-correction (F1-02)

When the servo driver is self-renewed or the motor runs unsteadily after a long time, the user is advised to use the current sampling zero-correction function.



Press STA/ESC to exit, please power on again.

4. Software enable (F1-05)

Parameter	Signal name	Setting	Meaning	Change	Effective
P0-03	Enable mode	0	Not enable	Servo OFF	At once
		1 （ default ）	I/O enable /S-ON		
		2	Forced enable (F1-05 or communication)		
		3	Fieldbus enable (the model which supports motion bus)		
F1-05 = 0: cancel enable, enter bb status.					
F1-05 = 1: forced enable, servo is in RUN status.					

Note:

- (1) F1-05 = 1 (provided P0-03 = 2) bit software is forced to enable, and the forced enable will be invalid after power on again.
- (2) If the user wants to enable as soon as the power is on, and it still takes effect after power failure, P5-20 is set to n.0010. (P0-03 = 1 effective)

5. clear the turns of absolute encoder (F1-06)

First turn the servo off, and then clear the number of turns of the absolute value encoder. The operation is as follows:

(1) Number of panel cleaning turns

Write 1 to F1-06 through panel operation to clear the number of turns of absolute value encoder;

(2) Number of communication clear turns

Write 1 to 0x2106 hexadecimal address through Modbus RTU to clear the number of turns (servo BB status takes effect, and write 0x2106 to 0 after clearing)

(3) Communication calibration zero position

Write 3 to 0x2106 hexadecimal address through Modbus RTU to calibrate the current position as zero. See U0-94 ~ U0-97 for the calibrated encoder position value. Using Xinje PLC, you can read (Modbus address 0x105e) 4 consecutive bytes with REGR command.

5.DS5 series rigid gain adjustment

The new generation DS5 series servo has rigid adaptive, self-tuning and manual adjustment modes, without complicated parameter adjustment process, which greatly saves the gain adjustment time. (refer to the chapter of servo gain adjustment in the user manual for details)

Mode	Type	Parameters	Rigidity	Responsiveness	Related parameters
Adaptive	Automatic adaptation	P2-01.0=1	middle	150ms	P2-05 adaptive speed loop gain P2-10 adaptive speed loop integral P2-11 adaptive position loop gain P2-07 adaptive inertia ratio P2-08 adaptive speed observer gain P2-12 adaptive stable max inertia ratio
Self-tuning	Fast adjusting	P2-01.0=0	high	10~50ms	P0-07 first inertia ratio P1-00 speed loop gain
	Automatic adjustment		high	10ms	P1-01 speed loop integral P1-02 position loop gain
	Manual adjusting		high	Determined by parameters	P2-35 Torque instruction filtering time constant 1 P2-49 Model loop gain

Adaptive function: adaptive function refers to the function that can obtain stable response through automatic adjustment regardless of the type of machinery and load fluctuation.

Quick adjustment function: the quick adjustment needs to estimate the moment of inertia of the load before turning off the adaptive function. If the inertia does not match, it will cause oscillation alarm. The rapidly adjusted gain parameters belong to the self-tuning mode.

Automatic adjustment function: automatic adjustment refers to the function that the servo unit automatically adjusts according to the mechanical characteristics when performing automatic operation (forward and reverse reciprocating motion) within the set range or receiving the operation command of the upper device. Automatic adjustment is divided into internal command self-tuning and external command self-tuning.

Automatic adjustment (internal command self-tuning) refers to the function that the servo unit performs automatic operation (forward and reverse reciprocating motion) without sending commands from the upper device, and adjusts according to the mechanical characteristics during operation.

Automatic adjustment (external command self-tuning) is the function of automatic optimal adjustment for the operation command from the upper device.

Manual adjustment function: manual adjustment is the function of manually setting parameters such as speed loop, position loop, model loop gain and vibration frequency in self-tuning mode to achieve rapid response.

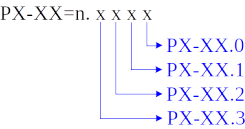
5-1.DS5 series fast adjustment mode

Quick adjustment requires setting the moment of inertia of the load before turning off the adaptive function. If the inertia does not match, it will cause oscillation alarm.

5-1-1.Fast adjustment steps

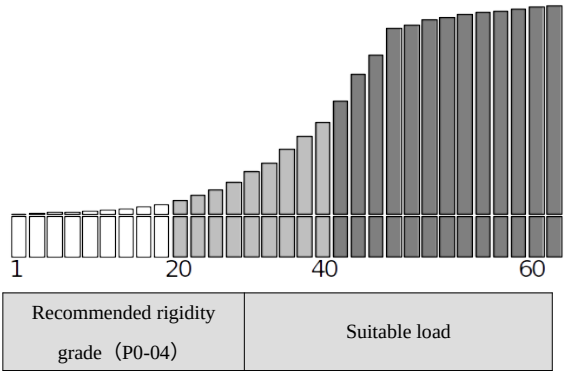
- 1. The load inertia is estimated through the driver panel or XinJeServo software;
- 2. Turn off the adaptive mode and change P2-01.0 to 0;
- 3. Set the required rigidity grade P0-04.

Note: P2-01.0 is the rightmost bit of P2-01 parameter, as shown below:



5-1-2. Corresponding parameters of rigidity grade

The rigidity level shall be set according to the actual load. The greater the P0-04 value, the greater the servo gain. If vibration occurs in the process of increasing the rigidity level, it should not continue to increase. If vibration suppression is used to eliminate the vibration, you can try to continue to increase. The following is the rigidity grade corresponding to the recommended load for reference only.



10~15	Large machinery
15~20	Low rigidity equipment such as synchronous belt
20~30	Screw rod, direct connection and other equipment with high rigidity

5-1-3. Notes

In the quick adjustment mode, the gain parameters corresponding to the rigidity level can be adjusted independently.

In order to ensure stability, the gain of the model loop is small at low rigidity level. When there is a high response requirement, this parameter value can be added separately. When vibration occurs during rapid adjustment, the torque command filter P2-35 can be modified. If there is no effect, the mechanical characteristic analysis is used to set the relevant notch parameters.

The quick adjustment mode will be configured with a rigidity level by default. If the gain does not meet the mechanical requirements, please set it gradually by increasing or decreasing. At present, the gain switching function is not supported, that is, the second gain parameters such as P1-05, P1-06 and P1-07 are invalid.

5-2. DS5 series self-tuning mode

Both internal command self-tuning and external command self-tuning can be executed through the driver panel and XinJeServo software.

Tuning mode	Operate tool	Limit
Internal command self-tuning	XinJeServo software	All versions of upper computer software support
External command self-tuning	Driver panel	Drive firmware requires 3700 and above

Note: the drive firmware version can be viewed through U2-07.

5-2-1. Notes

The following parameters may be modified during automatic adjustment. Do not change them manually in the process of automatic adjustment.

Parameter	Name	Property	The influence of numerical value on gain after auto-tuning
-----------	------	----------	--

P0-07	First inertia ratio	Gain performance parameters	Yes
P1-00	First speed loop gain		
P1-01	Integral time constant of the first speed loop		
P1-02	First position loop gain		
P2-00.0	Disturbance observer switch		
P2-01.0	Adaptive mode switch		
P2-35	Torque command filter time constant 1		
P2-41	Disturbance observer gain		
P2-47.0	model loop switch		
P2-49	model loop gain	Gain performance parameters	Yes
P2-55	model speed feedforward gain		
P2-60.0	Active vibration suppression switch		
P2-61	Active vibration suppression frequency		
P2-62	Active vibration suppression gain		
P2-63	Active vibration suppression damping		
P2-69.0	First notch switch		
P2-69.1	Second notch switch		
P2-71	First notch frequency		
P2-72	First notch attenuation		
P2-73	First notch band width		
P2-74	Second notch frequency		
P2-75	Second notch attenuation		
P2-76	Second notch band width		
P2-17	Inertia identification and internal instruction auto-tuning max speed	Auto-tuning setting parameters	No
P2-86	auto-tuning jog mode		
P2-87	auto-tuning min limit position		
P2-88	auto-tuning max limit position		
P2-89	auto-tuning max speed		
P2-90	auto-tuning acceleration/deceleration time		

Note: P2-60~P2-63 are automatically modified in auto-tuning process. Users are not allowed to modify them

manually. Manual modification may lead to the risk of system runaway.

5-3.DS5 series manual adjustment mode

Manual adjustment mode is to manually set the relevant parameters of self-tuning in the self-tuning mode, so as to solve the problems in some specific occasions, such as the failure of upper computer self-tuning, the failure of self-tuning and the failure of self-tuning.

5-3-1.Adjustment steps example

In position mode, if soft mode (P2-02.0 = 1) is selected for self-tuning, the function of model ring is closed; Set loop gain is invalid in speed mode.

When improving response

- 1. Reduce torque command filtering time constant (P2-35)
- 2. Increase speed loop gain (P1-00)
- 3. Decrease speed loop integration time parameter (P1-01)
- 4. Increase position loop gain (P1-02)
- 5. Increase model loop gain (P2-49)

Reduce response to prevent vibration and overshoot

- 1. Reduce speed loop gain (P1-00)
- 2. Increase the integral time constant of velocity loop (P1-01)
- 3. Reduce position loop gain (P1-02)
- 4. Increase the torque command filtering time constant (P2-35)
- 5. Reduce model loop gain (P2-49)

5-3-2. Reference values of inertia gain parameters of different loads in manual adjustment mode

Inertia of the load	P1-00	P1-01	P1-02	P2-49
Less than 10 times	400~500	1000~1500	400~500	About 1000
10~30 times	300~400	1500~2000	400~500	About 800

30~50 times	200~300	2000~2500	300~400	About 500
More than 50 times	About 200	About 3000	200~300	100~400

Note: the data in this table is the structure of 60/80 motor synchronous belt as an example.

5-4.DS5 adaptive mode

When the responsiveness requirement is not high, it can be used quickly only by setting functional parameters such as gear ratio and enable, so as to save servo adjustment time. Adaptive function refers to the function that can obtain stable response through automatic adjustment regardless of machine type and load fluctuation. Servo on automatically starts adjustment.

5-4.1.Adaptive mode parameter adjustment effect

parameter Small inertia / large inertia	Name	Default value	setting range	Effect
P2-05/P6-05	Adaptive speed loop gain	400/200	200~400	Reducing can improve the capacity of belt inertia, but it will reduce the responsiveness and have a great impact on the responsiveness
P2-07/P6-07	Adaptive load inertia ratio	0/50	0~200	The capacity with inertia can be greatly improved by increasing, and the responsiveness will not be affected, and it is easy to oscillate if it is too large
P2-08/P6-08	Adaptive speed observer gain	60/40	30~60	Reducing P2-08 and increasing P2-12 can greatly improve the capacity with inertia, but it will reduce the responsiveness and have a great impact on the responsiveness
P2-12/P6-12	Adaptive mode stable maximum inertia ratio	30/50	30~60	
P2-10	Integral time coefficient of adaptive mode speed loop	500	200~max	Adjust as needed, generally increase
P2-11	Adaptive mode position loop	100	50~200	Adjust as needed to increase the acceleration response and reduce the

parameter Small inertia / large inertia	Name	Default value	setting range	Effect
	gain coefficient			deceleration response
P2-16	Rotor inertia coefficient of adaptive mode motor	100	100~200	Increasing the servo rigidity and enhancing the anti disturbance ability can solve the running jitter
P2-19	Adaptive control bandwidth	50~70	40~80	The increase will slightly improve the inertia capacity of the belt and has little impact on the responsiveness. It is used as an auxiliary parameter

(1) P2-19 different power drivers have different default values.

(2) The default value of P2-05 in drives of 1.5KW and above is 200.

5-4-2. Recommended inertia ratio under default parameters

Motor flange	Recommended load inertia ratio for small inertia mode	Recommended load inertia ratio for large inertia mode
40	Less than 20 times	20 times~80 times
60	Less than 20 times	20 times~80 times
80	Less than 20 times	20 times~80 times
130	Less than 10 times	10 times~20 times
180	Less than 5 times	5 times~20 times

If the load inertia exceeds the recommended value in the table, the gain related parameters need to be modified as follows:

1. If the inertia is about 20 to 30 times

Appropriately increase P2-07 and reduce P2-05 if necessary; You can also refer to the following super inertia commissioning method.

2. Commissioning experience of super large inertia (50 ~ 100 times inertia)

Increase P2-12 (40 ~ 50 recommended), decrease P2-08 (40 ~ 50 recommended), decrease P2-05 (100 ~ 300 recommended), and increase P2-07 (10 ~ 100 recommended) to adjust flexibly according to the load inertia.

Application examples:

1 30 times inertia load gain parameter

Modify P2-08 = 50 P2-12 = 40 P2-07 = 50 under default parameters

2 80 times inertia load gain parameter

Under the default parameter, modify P2-08 = 40 P2-12 = 50 P2-07 = 50 P2-05 = 200 P2-10 = 1000

5-5. Estimation of inertia ratio

5-5-1.Steps for estimating inertia ratio

Before inertia identification, please use F1-00 jog function to confirm the servo rotation direction. At the beginning of inertia identification, Inc or Dec determines the initial direction of servo operation!

If the servo jitters under the adaptive default parameters, please switch to the adaptive large inertia mode (P2-03.3 = 1) to ensure the stable operation of the servo before inertia identification!

When the servo is in BB state, enter the parameter F0-07 display:



5-5-2.Description of inertia ratio estimation

■ Equipment whose inertia ratio cannot be estimated

It is impossible to estimate the inertia ratio of some equipment, such as equipment with extremely short stroke, equipment that can only run in one direction, two axis synchronous screw equipment, etc. The inertia ratio of such equipment cannot be estimated and can only be calculated or estimated according to the mechanical structure; If you know the structure type and relevant data of the equipment, you can directly calculate the relatively accurate inertia ratio. If there is no such information, refer to the following steps:

1. Preset inertia ratio P0-07 = 500
2. Set the default rigidity grade P0-04 (15 for 750W and below; 10 for 1.5KW and above)
3. Operate at low speed and observe the servo operation

(1) If the servo operates stably, the load inertia ratio is between 0% and 600%. Next, adjust the rigidity level according to the actual needs to achieve the rigidity and responsiveness required by the equipment.

(2) If the servo operation jitters or shakes; It shows that the actual load inertia ratio is far greater than 500%; At this time, change P0-07 to 1000 and run the equipment again to see if it shakes; If there is no jitter, the inertia is appropriate; If it still jitters, continue to increase P0-07 to 1500%, and so on. However, in this process, it should be noted that the greater the load inertia ratio is, the smaller the rigidity grade P0-04 can only be, otherwise it will cause vibration caused by excessive gain. Therefore, when P0-07 = 500, the default rigidity grade is OK. When P0-07 is larger, please reduce the rigidity grade P0-04 appropriately; When the

inertia ratio is confirmed and the load can operate stably, it is considered to correct whether the rigidity grade P0-07 meets the rigidity and responsiveness required by the equipment.

(3) In the above two cases, after confirming the approximate load inertia ratio, start the next operation; Fine tuning of rigidity and responsiveness.

4. After determining the inertia ratio P0-07, start to modify P0-04 appropriately. If P0-04 is small, the rigidity is weak, and jitter and overshoot will occur during operation or positioning. At this time, P0-04 needs to be increased until the phenomenon is eliminated; If there is still jitter after increasing P0-04 to the maximum (vibration will occur when the gain is too large, so as to judge the upper limit value of P0-04), at this time, it can be considered to increase the command filtering, such as PLC acceleration and deceleration time or use the command filtering P1-24 and P1-25 of servo driver.

5. After confirming the rigidity, confirm again whether the servo response can meet the equipment operation requirements. If it meets the requirements, the commissioning is completed. If the response is slow, P2-49 can be modified separately. The greater the value, the faster the response. Generally, it is set at 1000 to 4000, and the maximum is no more than 6000. The value of P2-49 needs to be used together with the rigidity level. If P0-04 is small and P2-49 is large, overshoot is easy to occur during operation. P1-24 or P1-25 or command acceleration and deceleration time can be considered to suppress overshoot.

■ Equipment capable of estimating inertia ratio

The equipment that can estimate the inertia ratio can directly identify the inertia. If the driver panel is used for operation, execute F0-07 directly according to the manual. If the upper computer software is used, execute according to the operation steps. After execution, the inertia ratio will be automatically written into P0-07. There are two extremes in the estimated inertia ratio.

1. The estimated inertia ratio is 0

If the inertia ratio is estimated to be 0, it does not mean that the estimation fails. When the DS5 servo is in the empty axis state, the estimated inertia ratio is 0. The most common scenario in this case is that the motor is connected with the reducer and then the load is connected, and the actual load inertia may be relatively small. First, understand the lower reducer: assuming that the reduction ratio is 1:10, if the load directly carried by the motor is 10 times the inertia, after installing the reducer and carrying the load, the load inertia ratio becomes $10 \div (10^2) = 0.1$ times (P0-07 = 10). Therefore, when there is a reducer, it is possible to estimate the load inertia ratio as 0. You can directly set it to see whether the equipment operates normally. If it operates normally, the inertia ratio P0-07 will not be changed. If it is not normal, there may be a sudden change in torque during load operation, resulting in inaccurate inertia identification. Refer to the above equipment that cannot estimate the inertia ratio.

2. Estimated inertia ratio failure

The most common failures are: using the panel to estimate the inertia ratio to display ERR-1 (motor torque saturation) and using the upper computer software to estimate the inertia ratio to prompt "inertia estimation failed, please reconfigure the travel! The motor reaches the torque limit".

Both cases are caused by the maximum torque output when estimating the inertia. The root cause is that the load inertia is relatively large, and the default inertia identification speed and initial inertia ratio do not match it. If an alarm occurs, the following parameters need to be modified to continue inertia identification:

P2-17 inertia identification and internal command self-tuning maximum speed; P2-18 initial inertia ratio of inertia identification.

By default, P2-17 is one third of the rated speed of the current motor, and P2-18 is 500; It can be modified to P2-17 = 500 and P2-18 = 1000. If the alarm still occurs, it can be modified to P2-17 = 300 and P2-18 = 2000 again; The modified direction is to reduce the speed P2-17 and increase the initial inertia P2-18 ratio of inertia identification to reduce the running torque.

After the estimation of inertia ratio, set the rigidity level P0-04 and modify the gain P2-49 separately.

5-6.Gain adjustment application function

5-6-1.Second set of gain adjustment

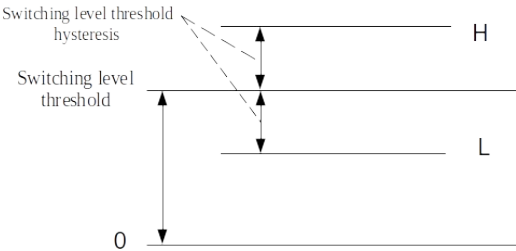
The following functions are only supported in version 3770 and later.

Parameter		Meaning	Default setting	Modify	Effect
P1-14	n□□□0	0-SI terminal switching gain is valid (gain switching condition parameters are not valid) 1 - perform gain switching according to gain switching conditions 2 - reserved	0	Servo bb	At once
	n□□□1	n.□□X□: Gain switching condition selection 0 - 1st gain fixed 1 - switching using external SI terminals 2 - large torque command 3 - high speed command 4 - speed command changes greatly 5 - [reserved] - fixed as the first gain			

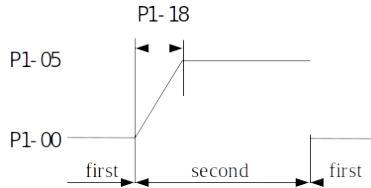
Parameter		Meaning	Default setting	Modify	Effect
		6 - large position deviation 7 - position command 8 - positioning completed 9 - high actual speed A - position command + actual speed			
P1-15		Gain switching waiting time	5	Servo bb	At once
P1-16		Gain switching level threshold	50	Servo bb	At once
P1-17		Hysteresis of gain switching level threshold	30	Servo bb	At once
P1-18		Position loop gain switching time	2	Servo bb	At once

Note:

- (1) The gain switching waiting time takes effect only when the second gain is switched back to the first gain.
- (2) The definition of "gain switching level threshold hysteresis" is shown in the following figure:



- (3) Description of "position gain switching time":



(4) Description of gain switching conditions

Gain switching condition setting			Related parameter		
P1-14.1	condition	Diagram	P1-15 Wait time	P1-16 Grade threshold	P1-17 threshold Hysteresis loop
0	First gain fixed	-	Invalid	Invalid	invalid
1	Terminal switching		Valid	Invalid	Invalid
Gain switching using G-SEL signal: G-SEL signal is invalid, group 1 gain; G-SEL signal is valid, group 2 gain.					
2	Torque command		Valid	Valid (%)	Valid (%)
<p>When the absolute value of torque command exceeds (level + hysteresis) [%] at the last first gain, switch to the second gain;</p> <p>In the last second gain, the absolute value of the torque command is less than (level - hysteresis) [%], and then wait until P1-15 remain in this state, return to the first gain.</p>					

Gain switching condition setting			Related parameter		
P1-14.1	condition	Diagram	P1-15 Wait time	P1-16 Grade threshol d	P1-17 thresho ld Hystere sis loop
3	Speed command	<p>When the absolute value of the speed command exceeds (level + hysteresis) [RPM] at the last first gain, switch to the second gain;</p> <p>At the last second gain, the absolute value of the speed command is less than (level - hysteresis) [RPM], and then wait until P1-15 remain in this state, return to the first gain.</p>	Valid	Valid	Valid
4	speed command changing rate	<p>In the last first gain, when the absolute value of the speed command change rate exceeds (level + hysteresis) [10rpm/s], switch to the second gain; At the last second gain, when the absolute value of the speed command change rate is less than (level - hysteresis) [10rpm / s], wait until P1-15 remain in this state, and return to the first gain.</p>	Valid	Valid (10rpm/s)	Valid (10rpm/s)

Gain switching condition setting			Related parameter		
P1-14.1	condition	Diagram	P1-15 Wait time	P1-16 Grade threshold	P1-17 threshold Hysteresis loop
5	Speed command high and low speed threshold [not supported temporarily]	<p>In the last first gain, when the absolute value of the speed command exceeds (level-hysteresis) [RPM], switch to the second gain, and the gain gradually changes. When the absolute value of the speed command reaches (level + hysteresis) [RPM], the gain completely changes to the second gain;</p> <p>At the last second gain, when the absolute value of the speed command is lower than (level + hysteresis) [RPM], it starts to return to the first gain, and the gain changes gradually. When the absolute value of the speed command reaches (level-hysteresis) [RPM], the gain completely returns to the first gain.</p>	Invalid	Valid (rpm)	Valid (rpm)
6	Position offset	<p>Valid only in position mode (other modes are fixed as the first gain)</p> <p>When the absolute value of position deviation exceeds (level + hysteresis) [encoder unit] at the last first gain, switch to the second gain; In the last second gain, the state when the absolute value of the position deviation is less than (level-hysteresis) [encoder unit], and then wait until P1-15 remain in this state, return to the first gain.</p>	Valid	Valid (encoder unit)	Valid (encoder unit)

Gain switching condition setting			Related parameter		
P1-14.1	condition	Diagram	P1-15 Wait time	P1-16 Grade threshol d	P1-17 thresho ld Hystere sis loop
7	Position command		Valid	Invalid	Invalid
		<p>Valid only in position mode (other modes are fixed as the first gain):</p> <p>In the last first gain, if the position command is not 0, switch to the second gain; At the last second gain, if the position command is in the state of 0, it returns to the first gain when the waiting time P1-15 remains in this state.</p>			
8	Positioning completion		Valid	Invalid	Invalid
		<p>Valid only in position mode (other modes are fixed as the first gain)</p> <p>In the last first gain, if the positioning is not completed, switch to the second gain; At the last second gain, if the state of positioning completion remains in this state for the waiting time P1-15, the first gain is returned.</p> <p>Note: it is necessary to set the mode of positioning completion detection according to P5-01.</p>			
9	Actual speed		Valid	Valid (rpm)	Valid (rpm)
		<p>Valid only in position mode (other modes are fixed as the first gain):</p>			

Gain switching condition setting			Related parameter		
P1-14.1	condition	Diagram	P1-15 Wait time	P1-16 Grade threshold	P1-17 threshold Hysteresis loop
		<p>When the absolute value of the actual speed exceeds (level + hysteresis) [RPM] at the last first gain, switch to the second gain;</p> <p>At the last second gain, the absolute value of the inter speed is less than (level-hysteresis) [RPM], and then wait until P1-15 remain in this state, return to the first gain.</p>			
A	Position command+ actual speed		Valid	Valid (rpm)	Valid (rpm)
		<p>Valid only in position mode (other modes are fixed as the first gain):</p> <p>In the last first gain, if the position command is not 0, switch to the second gain;</p> <p>At the last second gain, the state in which the position command is 0 maintains the second gain within the waiting time P1-15;</p> <p>When the position command is 0 and the waiting time P1-15 arrives, if the absolute value of the actual speed is less than (level) [RPM], the speed integral time constant is fixed at the second speed loop integral time constant (P1-07), and the others return to the first gain; If the absolute value of the actual speed is less than (level-hysteresis) [RPM], the speed integral also returns to the integral time constant of the first speed loop (P1-02).</p>			

5-7. Solution of vibration problem

There are two possible reasons for resonance during gain adjustment: one is mechanical resonance and the other is too high servo gain. How to judge the two reasons?

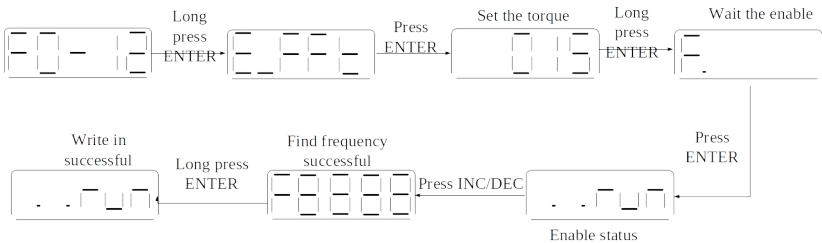
After estimating the inertia, the driver uses the default rigidity level. If the servo runs stably but there is high-frequency noise, reduce the rigidity level. If there is still high-frequency noise from 15 to 10, it is

mechanical resonance. If the high-frequency noise is generated due to the gradual increase in the rigidity level adjustment process, the vibration is caused by excessive gain, and the current rigidity level is the upper limit value of the mechanism.

5-7-1. The servo and mechanical connections themselves produce resonance

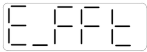
Resonance can be solved by reducing the gain or setting a notch filter. If the notch filter needs to find out the resonance frequency first, it can be identified by using the simple and fast FFT function of the driver or mechanical characteristic analysis.

Fast FFT operation steps



Operation steps:

F0-12, long press **ENTER** to enter FFT function, it shows 'E_Fft'.



Click [Enter] to enter the torque setting interface and display the currently set torque value, that is, the value of P6-89. Click [Inc] and [Dec] to increase or decrease the torque command. When increasing the torque command size, it is recommended to increase it a little to avoid severe vibration of the equipment;



After setting the torque command, long press [Enter] to enter the "ready to enable" stage, and the interface displays "F.";



Press **ENTER** , enable, displays '...run';



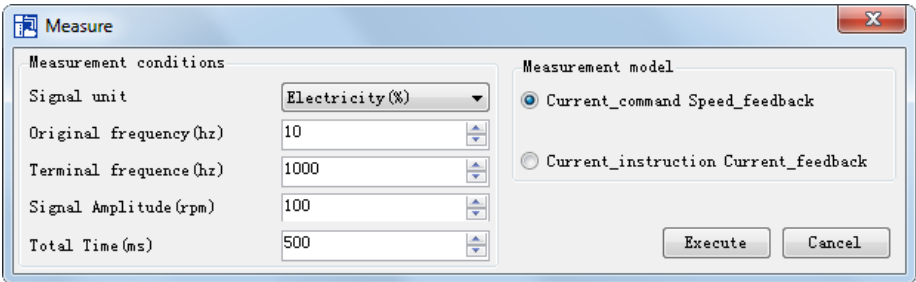
Click [Inc] and [Dec] to carry out forward and reverse rotation and find the resonance frequency. During operation, the interface flashes 'E_Fft' , if the resonance frequency is found, the interface will display 'Fxxxx', xxxx is the resonance frequency. If the search for the functional frequency fails, the interface will display 'F ----';



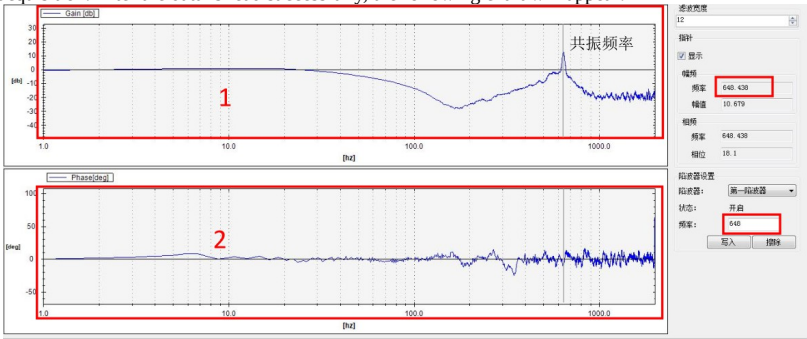
Whether 'Fxxxx' or 'F ---' is displayed, you can continue to click [Inc] and [Dec] to find the resonance frequency again. If the resonance frequency is found, you can long press [Enter] to set the resonance frequency displayed on the interface to the notch filter in the driver.



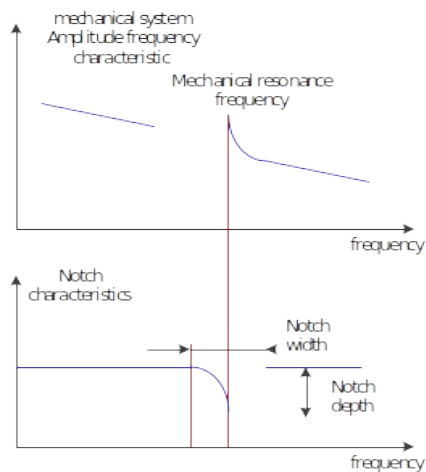
- Mechanical characteristic analysis
 1. open XinJeServo software, click mechanical properties;
 2. click measure;



Click 【enable】 then click . The servo motor will make a slight sound and wait for the completion of data acquisition. After the data is read successfully, the following chart will appear:



Red box 1 is the amplitude frequency characteristic curve, which can be used to judge the resonance frequency. The resonance frequency curve will have the following characteristics:



Then set the measured resonance frequency; If it is set on the parameter page, the corresponding notch switch and notch frequency need to be set. If the first notch is used, P2-69.0 = 1 and P2-71 = 648 should be set.

5-7-2. Vibration caused by excessive gain

In position mode, if soft mode (P2-02.0 = 1) is selected for self-tuning, the function of model ring is closed; Set loop gain is invalid in speed mode.

6.Alarm list

Type		Code	Description	Reasons	Solutions
EEEE	1	EEEE1	Communication error between panel and CPU	(1) Voltage fluctuation of power supply is large, and low voltage leads to failure of panel refresh; (2) Damage of panel program	(1) Stable power supply to ensure the stability of power supply voltage. (2) after repower on the driver, if the alarm cannot be removed, please contact the agent or the manufacturer.
	2	EEEE2			
	3	EEEE3			
	4	EEEE4			
01	0	E-010	Firmware version mismatch	Downloaded firmware version error	please contact the agent or the manufacturer
	2	E-012	System Loading Error	Program damage	please contact the agent or the manufacturer
	3	E-013	FPGA Loading Error	(1) Program damage (2) Device damage	please contact the agent or the manufacturer
	4	E-014	FPGA Access error	(1) Program damage (2) Device damage (3) serious external interference	please contact the agent or the manufacturer
	5	E-015	Program running error	Program damage	please contact the agent or the manufacturer
	6	E-016	Processor Running Error	Hardware damage	please contact the agent or the manufacturer
	7	E-017	Processor Running Timeout	Program damage	please contact the agent or the manufacturer
	8	E-018	FPGA running timeout	Program damage	please contact the agent or the manufacturer
	9	E-019	System password error	Program damage	please contact the agent or the manufacturer
02	0	E-020	Parameter loading error	Failure of parameter self-checking	Re-energizing can restore default parameters, if there are repeated problems, please contact the agent or manufacturer.

	1	E-021	Parameter range beyond limit	Setting values are not within the prescribed range	Check parameters and reset them
	2	E-022	Parameter conflict	Conflict of TREF or VREF Function Settings	P0-01=4, P3-00 set to 1 will alarm
	3	E-023	Sampling channel setting error	Error setting of custom output trigger channel or data monitoring channel	Check that the settings are correct
	4	E-024	parameter lost	Low voltage of power grid	(1) If it is single-phase 220V power supply, please connect L1 and L3. (2) show E-024 immediately after power failure (3) Resetting parameters
	5	E-025	Erase FLASH error	Abnormal parameter preservation during power failure	please contact the agent or the manufacturer
	6	E-026	Initialization FLASH error	Power supply instability of FLASH chip	please contact the agent or the manufacturer
	8	E-028	EEPROM write error	Voltage instability or chip abnormality	please contact the agent or the manufacturer
03	0	E-030	Bus voltage U0-05 is higher than the actual preset threshold, and lasts for P0-83 setting time to alarm. 220V Power Supply Machine (U0-05≥390V) 380V Power Supply Machine (U0-05≥50V)	High voltage of power grid	Check the fluctuation of power grid, 220V driver normal voltage range 200V ~ 240V, 380V driver normal voltage range 360V ~ 420V. If the voltage fluctuation is large, it is recommended to use the correct voltage source and regulator.
				Excessive load moment of inertia (insufficient regeneration capacity)	(1) connect external regenerative resistor, (220V: bus voltage U0-05 = 380 discharge starts, U-05 = 350 discharge ends; 380V: U-05 = 700

					<p>discharge starts, U-05 = 660 discharge ends;)</p> <p>(2) Increasing Acceleration and Deceleration Time</p> <p>(3) Reducing load inertia</p> <p>(4) Reduce start-stop frequency</p> <p>(5) Replacement of larger power drivers and motors</p>
				Brake resistance damage or excessive resistance value	Check the regenerative resistor and replace the external resistor with the appropriate resistance value. See chapter 1.4.1 for the selection of the external resistor.
				Acceleration and deceleration time is too short	Extending Acceleration and Deceleration Time
				Hardware Fault of Driver Internal Sampling Circuit	<p>The AC gear of the multimeter measures the input value of the servo LN (R/S/T), which is $220V \pm 10\%$ of the normal value. If the power supply voltage is more than $220V+10\%$ ($380V+10\%$), check the power supply voltage; if the power supply voltage is normal, then the servo BB state, monitor U0-05, the voltage measured by the multimeter $* 1.414 < U0-05$ (within 10V error), then the servo driver is faulty and needs to be sent back for repair.</p>
04	0	E-040	Bus voltage U0-05 is lower than the actual preset threshold. 220V power supply	low voltage of power grid when normal power on	(1) Check the fluctuation of power grid. The normal voltage range of 220V driver is 200V~240V. If the voltage fluctuation is large, the

			machine (U0-05 ≤ 150V) 380V power supply machine (U0-05 ≤ 350V)		voltage regulator is recommended. (2) Replacement of larger capacity transformers
				Instantaneous power failure	Re-energize after voltage stabilization
				Hardware Fault of Driver Internal Sampling Circuit	The AC gear of the multimeter measures the input value of the servo LN (R/S/T), which is 220V ± 10% of the normal value. If < 220V + 10% (380V + 10%), then check the supply voltage; if the supply voltage is normal, then servo BB state, monitoring U0-05, multimeter measurement voltage * 1.414 > U0-05 (error within 10V), then the servo driver is faulty and needs to be sent back for repair.
	1	E-041	Driver power down	Driver power off	Check the power supply
3		E-043	Bus Voltage Charging Failure	low voltage of power grid when normal power on	low voltage of power grid when normal power on
				Hardware damage	When the driver is on, please pay attention to whether there is relay actuation sound.
	4	E-044	Phase loss of three-phase voltage input	Phase loss of three-phase input power supply	Check the power supply
6	0	E-060	Module temperature is too high (Module temperature U-06 ≥ 90°C alarm, U-06 ≥ 70°C Warning)	Running under heavy load for a long time	Re-consider the capacity of the motor, monitor the U0-02 torque during operation, whether it is in the value of more than 100 for a long time, if yes, please chose the large-capacity motor or load

					reduction.
				Excessive ambient temperature	(1) Enhance ventilation measures to reduce ambient temperature; (2) Check whether the fan rotates when the servo is enabled; when the module temperature U-06 $\geq 45^{\circ}\text{C}$, the fan opens.
				Fan damage	Replace the fan
	1	E-061	Motor overheat	Alarm when motor temperature is higher than 95°C	(1) Check whether the motor fan is abnormal; (2) Contact the manufacturer for technical support
08	3	E-063	Thermistor disconnection alarm	(1) The thermistor of 11kw and above motor is disconnected (2) False opening detection and disconnection alarm of motors below 11kw	Check the connection of external thermistor; Shielding thermistor disconnection alarm: P0-69.1 = 1
	0	E-080	Overspeed (actual speed \geq P3-21/P3-22) The maximum forward speed is P3-21 and the maximum reverse speed is P3-22.	Motor code not match	Check if the driver P0-33 is identical with the motor code of the motor label (the number after MOTOR CODE), if not, please change to the same one, then power on again.
				UVW wiring error	Inspection of motor UVW wiring, need to be connected in phase sequence.
				Motor speed too fast	(1) The maximum speed limit value P3-21/P3-22 was reduced. (2) To confirm whether the external force makes the motor rotate too fast, whether the pulse input frequency is too high, and whether

					the electronic gear ratio is too large.
				Encoder fault	(1) Check the encoder cable or change a new one (2) Set the servo driver to BB state and the driver to U-10. Rotate the motor shaft slowly by hand to see if the value of U-10 changes normally, increasing in one direction and decreasing in one direction (0-9999 cycle display).
				Parameter setting	When the actual speed is greater than the value of P3-21/P3-22, the alarm will be given.
		E-092	Analog Tref Zero-Calibration Over limit	Analog Zero Calibration Operation Error	Please correct zero without analog voltage
		E-093	Analog Vref Zero-Calibration Over limit	Analog Zero Calibration Operation Error	Please correct zero without analog voltage
10	0	E-100	Position offset too large	In position control, the difference between the given position and the actual position exceeds the limit value.	(1) Observe whether the motor is blocked or not. (2) Reducing the given speed of position; (3) Increase the deviation pulse limit P0-23.
11	0	E-110	External UVW Short Circuit Discovered in Self-Inspection	Not match the motor code	Check if the driver P0-33 is identical with the motor code of the motor label (the number after MOTOR CODE), if not, please change to the same one, then power on again.
				UVW wiring error	Inspection of motor UVW wiring, need to be in phase sequence (brown U, black V, blue W)

				Driver UVW Output Short Circuit or Motor Failure	<p>(1) Measure whether the UVW phase resistance of the motor is balanced. If the phase resistance is unbalanced, replace the motor.</p> <p>(2) Measure whether there is short circuit between UVW and PE of the motor. If there is short circuit, replace the motor.</p> <p>(3) Measure the driver side UVW output through multimeter (diode gear), black pen P+, red pen to measure UVW; red pen P-, black pen to measure UVW; if anyone is 0 in 6 groups of value, replace the driver.</p>
				Load part is blocked	It is suggested that the motor should be operated on an empty shaft to eliminate the load problem.
				High-speed start-stop instantaneous alarm	Increasing Acceleration and Deceleration Time
				Encoder problem	<p>(1) Check the encoder cable or change a new one</p> <p>(2) Set the servo driver to BB state and the driver to U-10. Rotate the motor shaft slowly by hand to see if the value of U-10 changes normally, increasing in one direction and decreasing in one direction (0-9999 cycle display).</p>
12	0	E-120	Abnormal Current Sensor	Current Sensor Damage or External Interference too serious	Check whether grounding is normal or not. If alarm cannot be ruled out, please contact the agent or manufacturer.

	1	E-121	Abnormal Zero Value of U Phase Current Sampling	Current Sensor Damage or External Interference too serious	Check whether grounding is normal or not. If alarm cannot be ruled out, please contact the agent or manufacturer.
	2	E-122	Abnormal Zero Value of V Phase Current Sampling	Current Sensor Damage or External Interference too serious	Check whether grounding is normal or not. If alarm cannot be ruled out, please contact the agent or manufacturer.
13	0	E-150	Power cable disconnection	Any phase in UVW of driver, cable or motor broken	Disconnect the power supply of the driver and check the connection of the power cable. It is suggested that the multimeter be used to test the condition. After eliminating the errors, the driver should be re-energized.
16	1	E-161	Driver thermal power overload	Not match the motor code	Check if the driver P0-33 is identical with the motor code of the motor label (the number after MOTOR CODE), if not, please change to the same one, then power on again.
				Overload, the actual operating torque exceeds the rated torque, and continuous operation for a long time. (Monitor U0-02 to check the actual operating torque. If the motor is in normal operation, it will not jam or jitter. If the U0-02 is longer than 100, it will	Increase the capacity of drivers and motors. Extend the acceleration and deceleration time and reduce the load. Monitor the U-00, whether it is running over speed.

				be considered improper selection of the motor.)	
				Mechanisms are impacted, suddenly weighted and distorted.	Eliminate mechanical distortion. Reduce load
				Motor action when motor brake is not opened	Measure the voltage of the brake terminal and decide to open the brake. It is suggested to use servo BK signal to control the brake lock. If it is not servo control, attention must be paid to the timing of brake opening and motor action.
				Wrong wiring of encoder cable, power cable or broken wire or loose pin of connector plug	Check the UVW connection of power cable to see if there is any phase sequence error. The multimeter is used to measure whether all the encoder cable are on. Check whether the plug is loose, for machine vibration, whether the plug has shrinkage pin, virtual welding, damage.
				In multiple mechanical wirings, incorrect connection of motor cable to other shafts leads to incorrect wiring.	Detection of servo wiring, the motor cable, encoder cable are correctly connected to the corresponding shaft.
				Poor gain adjustment results in motor vibration, back and forth swing and abnormal noise.	Readjustment of gain parameters

				Driver or motor hardware failure;	There are servo cross test or motor empty shaft on site, F1-01 trial operation, F1-00 jog run can not rotate uniformly; Replace the new driver or motor and send the malfunction machine back to the manufacturer for repair.
	5	E-165	Anti-blocking alarm Judging that the current motor output torque is greater than P3-28/P3-29 (internal forward/reverse torque limit), and the time reaches P0-74 (unit ms), and the speed is lower than P0-75 (unit 1 rpm).	(1) Machinery is impacted, suddenly becomes heavier and distorted; (2) When the brake of the motor is not opened, the motor moves; (3) The parameter setting is unreasonable.	(1) Eliminate the factors of mechanical distortion. Reduce load (2) Measure the voltage of the brake terminal and determine the opening of the brake; It is suggested to use servo BK brake signal to control the brake lock. If it is not servo control, attention must be paid to the timing of brake opening and motor action. (3) Monitor the actual output torque range of U0-02 and check whether the setting of P3-28/29 torque limit is reasonable.
20	0	E-200	Regenerative resistance overload	High Voltage Fluctuation in Power Grid	Stable the input voltage
				Selection of regenerative resistance is too small	Replacement of higher power regenerative resistors (refer to chapter 1.4.1)
				Acceleration and deceleration time is too short	Extending Acceleration and Deceleration Time
				Hardware damage	The AC gear of the multimeter measures the input value of the servo LN (R/S/T), which is 220V ±

					10% of the normal value. If the power supply voltage is more than 220V+10% (380V+10%), check the power supply voltage; if the power supply voltage is normal, then in servo BB state, monitor U0-05, the voltage measured by the multimeter $* 1.414 < U0-05$ (within 10V error), then the servo driver is faulty and needs to be sent back for repair.
22	0	E-220	Communication error of absolute servo encoder Absolute value servo encoder battery low voltage alarm (can shield this alarm) Absolute value servo encoder data access alarm	Motor matching error	Check if the motor matches correctly
				Unconnected encoder cable or poor contact	Disconnect the power supply of the driver, check the connection of the encoder cable, if there is cable loosening, it is recommended to use the multimeter to test the conduction condition; after eliminating errors, power on again Hot plugging is strictly prohibited, and special cables are required for tank chains.
				Received encoder data errors, and the number of errors exceeds the number of error retries of encoder registers P0-56	Encoder wire and strong power do not have the same pipeline wiring; install filter on servo driver power input side; encoder wire sleeves magnetic ring; shut down welding machine type of equipment with large interference
	2	E-222	Absolute Servo Encoder Value Overflow Communication error	Battery Voltage in Battery Box of Encoder cable is less than 2.75V	Please replace the battery while keeping the power supply ON of the servo driver in order to avoid the error of encoder position

			of absolute servo encoder		information. Battery specification: No.5 battery, 3.6V (model CP-B-BATT, CPT-B-BATT)
				Power on alarm for new machine	<p>(1) When the absolute value motor is powered off, the memory position depends on the battery on the encoder cable. Once the encoder cable and the motor are disconnected, the power supply can not be carried out, which will lead to the loss of the current position of the motor, it will alarm 222. Please set F0-00=1 to clear the alarm, it can be used normally.</p> <p>(2) The alarm can be shielded by using F0-79. When P0-79 is set to 1, it will be used as a single-loop absolute value motor, and the current position will not be remembered when power off.</p>
	3	E-223	Absolute value servo encoder battery low voltage alarm (can shield this alarm)	Usually the problem of the encoder itself, or the power supply of the encoder is unstable.	In the absence of batteries, this alarm may occur when the encoder cable is disconnected.
	7	E-227	Power on encoder multiturn signal data error	Generally, it is the problem of the encoder itself, or the power supply of the encoder is unstable	This alarm may occur when the encoder cable is unplugged without battery
	8	E-228	Absolute value servo encoder data access alarm	Motor continues to run in one direction, encoder data value is too large, overflow	<p>(1) F1-06=1 is used to clear cycles of the absolute value encoder</p> <p>(2) The alarm can be shielded by P0-79=1.</p>

24	0	E-240	Timing error in fetching encoder position data	<p>(1) The number of consecutive errors in the encoder data update sequence is greater than the value in P0-68 (set the number of errors P0-68.0 ~ P0-68.1 after version 3770).</p> <p>(2) CPU timer fluctuates.</p>	<p>(1) Restart the drive;</p> <p>(2) Check the arrangement of transmission cables to ensure that strong and weak currents are wired separately;</p> <p>(3) Separate power supply for high current equipment;</p> <p>(4) Well grounded.</p>
	1	E-241	Encoder responds to data scrambling	The received encoder data is wrong, and the number of errors exceeds the value in the encoder error retry number register P0-56 (after version 3770, set the number of errors P0-68.0 ~ P0-68.1)	<p>(1) Check the arrangement of transmission cables to ensure that strong and weak currents are wired separately;</p> <p>(2) Separate power supply for high current equipment;</p> <p>(3) Good grounding</p>
	3	E-243	Delta encoder abnormal	The status frame fed back by the encoder is wrong, which is the alarm of delta encoder itself	<p>(1) Check whether the encoder cable is normal;</p> <p>(2) Confirm whether the encoder is normal</p>
25	0	E-250	Zero return error alarm	<p>(1) P9-15 is not 0 and the total time to return to the origin exceeds the time set by P9-15</p> <p>(2) The parameter setting of the original function is wrong</p>	<p>(1) Increase P9-15;</p> <p>(2) Ensure that the direction of mechanical offset (P9-19, P9-20) is opposite to the direction of returning to the origin;</p> <p>(3) Check whether there is a problem with the origin signal;</p> <p>(4) Check the parameter setting of the new return to the original</p>

					function
26	0	E-260	Over range alarm	<p>Overrun signal was detected and the overrun processing mode was configured to alarm</p>	<p>If you do not want to alarm immediately when the overrun occurs, you can change the overrun signal processing mode.</p>
	1	E-261	Overrun signal connection error	<p>(1) When the motor is in forward rotation, it encounters reverse overrun signal.</p> <p>(2) When the motor is in reverse rotation, it encounters forward overrun signal.</p>	<p>Check over-run signal connection and over-run terminal allocation.</p>
	2	E-262	Control stop timeout	<p>(1) Excessive inertia</p> <p>(2) Stop timeouts too short</p> <p>(3) The setting of braking torque is too small.</p>	<p>(1) Reduce inertia or use brake motor;</p> <p>(2) Increase the stop timeout time P0-30;</p> <p>(3) Increase braking torque P3-32.</p>
	4	E-264	Excessive vibration	<p>(1) Oscillation caused by external forces</p> <p>(2) Load inertia is large and the setting of load inertia ratio is wrong or the gain is too small, which leads to the oscillation of positioning.</p>	<p>(1) Check the source of external force to see if there are any problems in mechanical installation;</p> <p>(2) Increase the servo gain to improve the anti-disturbance ability;</p> <p>(3) Acquisition speed curve analysis; When the first three peaks are converged after pulse instruction completed ($0.8 \times \text{first peak} > \text{second peak}$ and $0.8 \times \text{second peak} > \text{third peak}$), the driver should not alarm, which can adjust the relevant threshold.</p> <p>When the first three peaks speed are</p>

					not less than 300 rpm for three consecutive times after the completion of the pulse instruction, the driver will alarm. (4) Contact manufacturers for technical support
	5	E-265	Excessive motor vibration	Mechanical vibration	(1) Set P2-03.0 to 0; (2) Check motor installation
28	0	E-280	read motor code inside encoder error	Request to read EEPROM failed	(1) Check the disconnection of encoder; (2) On the premise that the professional determines that the driver and motor are matched and can be used together, it can (read the motor parameter alarm shielding bit) through P0-53 and correctly set P0-33 motor code
	1	E-281	An error occurred while writing data to the encoder EEPROM	Request to write EEPROM failed	On the premise that the professional determines that the driver and motor are matched and can be used together, it can (read the motor parameter alarm shielding bit) through P0-53 and correctly set P0-33 motor code
30	0	E-300	motor code error	Motion bus communication abnormal	Check the motion bus wiring
31	0	E-310	motor code lost	Motor code is error	Set correct motor code and power on again
	1	E-311	The motor code does not match the software version	Not set motor code	Set the motor code in P0-33
	2	E-312	Reading motor	There are motor	On the premise that the professional

			parameters is damaged	parameters in the motor encoder, but the parameter is 0 (this is the attribute of the motor encoder), and P0-33 is n.0000	determines that the driver and motor are matched and can be used together, it can be used through P0-53 (read the motor parameter alarm shielding bit) and correctly set P0-33 motor code
3	E-313	Encoder software version mismatch	Encoder software version mismatch	Encoder software version mismatch	(1) Update the driver firmware to give full play to the best performance of current motor parameters; (2) Through P0-53 (read the motor parameter alarm shielding bit) and correctly set P0-33 motor code, the motor parameters are in the driver and can work normally, but may affect some performance
4	E-314	The motor code does not match the software version		Update the motor parameters or software version	Contact the manufacturers
5	E-315	Invalid read parameter		There are motor parameters in the motor encoder, but the parameter is 0 (this is the property of the motor encoder), and P0-33 is not n.0000	On the premise that the professional determines that the driver and motor are matched and can be used together, it can be used through P0-53 (read the motor parameter alarm shielding bit) and correctly set P0-33 motor code
6	E-316	Automatic code reading error		The automatically read parameters are inconsistent with those of P0-33 motor	Check U3-70 and motor code on motor body nameplate. If the two values are different, contact the manufacturer's technical support

7.Servo parameter list

7-1.Control parameter list

Modification and effective:

“○” means modifying when servo OFF and take effect at once.

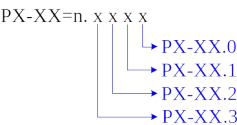
“√” means modifying anytime and take effect at once.

“●” means modifying when servo OFF and take effect when power on again.

“△” means modifying anytime and take effect when the motor doesn’t rotate.

For parameters set in hexadecimal system, the prefix "n." is added to the setting value to indicate that the current setting value is hexadecimal number.

Composition of parameters:



P0-XX:

P0-	Function	Unit	Default value	Range	Effective	Suitable mode
01	Control mode 1 1-Internal Torque Mode 2-External Analog Torque Mode 3-Internal speed Model 4-External Analog speed Mode 5-Internal Location Mode 6-External Pulse Position Mode 7-External Pulse speed Mode 8-XNET Bus Torque Mode 9-XNET Bus Speed Mode 10-XNET Bus Location Mode	-	6	1~10	○	1 3 5 6 7 8 9 10
02	Control mode 2 (ditto)	-	6	1~10	○	1 3 5 6 7 8 9 10
03	Enabling mode 0-not enabled	-	1	0~3	○	1 3 5 6 7 8 9 10

	1-IO enable 2-Software Enablation 3-XNET Bus Enablation					
04	Rigidity grade	-	20P1~20P7:15 >=21P5:10	0~63	△	1 3 5 6 7 8 9 10

P0-	Function	Unit	Default value	Range	Effective	Suitable mode
05	Definition of rotation direction 0- positive mode 1- negative mode	-	0	0~1	●	1 3 5 6 7 8 9 10
07	First inertia ratio	1%	500	0~50000	√	1 3 5 6 7 8 9 10
09.0	Forward Direction of Input Pulse Instruction 0-Forward Pulse Counting 1-Reverse Pulse Counting	-	0	0~1	●	6 7
09.2	Input pulse command filter time	-	F	0~F	●	6 7
09.3	Predistribution of input pulse command filter	-	0	0~7	●	6 7
10.0	0-CW/CCW 1-AB 2-P+D	-	2	0~2	○	6 7
11~12	Number of instruction pulses per cycle 0: Electronic gear ratio Non-0: Number of command pulses required for motor rotation	1 pul	10000	0~99999999	○	5 6
13	Electronic Gear Numerator	-	1	0~65535	○ (before 3770) √ (3770 and after only valid in mode	5 6

					6)	
14	Denominator of Electronic Gear	-	1	0~65535	○	5 6
15	pulse frequency corresponding to rated speed	100Hz	1000	1~10000	○	7
16	speed command pulse filter time	0.01ms	100	0~10000	○	7
23	pulse offset limit	0.01 turns	2000	0~65535	√	5 6 10
24.0	Type selection of discharge resistance (version 3640 and before) 0 - built in 1 - external Discharge resistance power protection mode (version 3700 and later) 0 - cumulative discharge time 1 - average power mode 1 2 - average power mode 2	-	0	0~2	○	1 3 5 6 7 8 9 10
25	Power Value of Discharge Resistance	W	Set as the model	1~65535	○	1 3 5 6 7 8 9 10
26	Discharge resistance value	Ω	Set as the model	1~500	○	1 3 5 6 7 8 9 10

P0-	Function	Unit	Default value	Range	Effective	Suitable mode
27	Servo shutdown the enable stop mode 0-Inertial Operation Stop 2-deceleration stop	-	0	0~5	○	1 3 5 6 7 8 9 10
28	Servo overtravel stop mode (P0-28.0) 0 - deceleration stop 1 1 - inertia stop 2 - deceleration stop 2 3 - alarm stop Overtravel alarm shield switch (P0-28.1)	-	2	0~3	○	1 3 5 6 7 8 9 10
			0	0~1		

P0-	Function	Unit	Default value	Range	Effective	Suitable mode
	0 - do not mask overtravel alarm					
29	Servo Alarm Stop Mode 0-Inertial Operation Stop 2-deceleration stop	-	2	0~2	○	1 3 5 6 7 8 9 10
30	stop timeout time	1ms	20000	0~65535	○	1 3 5 6 7 8 9 10
31	Deceleration stop time	1ms	25	0~5000	○	1 3 5 6 7 8 9 10
33	Set the motor code	-	0	0~ffff	●	1 3 5 6 7 8 9 10
53	Read motor parameter alarm shield bit 0- not shield alarm 1- shield alarm	-	0	0~1	●	1 3 5 6 7 8 9 10
55	Open loop rotation speed	-	0	- 6000~6000	●	1 2 3 4 5 6 7 8 9 10
56	Number of encoder communication attempt times	-	10	1~65535	●	1 2 3 4 5 6 7 8 9 10
68	P0-68.xx□□ Number of continuous error alarms in the update sequence of coded data	-	0x05	0x01~0xFF	●	1 2 3 4 5 6 7
	P0-68.□□xx E-241 alarm filter times		0	0~0xFF		1 2 3 4 5 6 7
69	Fan switch 0- Turn on the fan when the temperature greater than 45°C and turn off the fan when less than 42°C (hysteresis 3°C) 1 - Turn on the fan after enabling, turn off the fan when not enabling	-	1	0~1	√	1 3 5 6 7 8 9 10
69	Shielding switch for thermocouple disconnection alarm of large motor (P0-69.1) 0 - disconnection alarm of unshielded	-	0	0~1	√	1 3 5 6 7 8 9 10

P0-	Function	Unit	Default value	Range	Effective	Suitable mode
	thermocouple 1 - wire break alarm of shielded thermocouple					
74	Blocking alarm time	ms	Set as the model	0~65535	√	1 3 5 6 7 8 9 10
75	Blocking alarm speed	rpm	50	5~9999	√	1 3 5 6 7 8 9 10
79	Absolute value encoder battery undervoltage alarm switch 0 - used as absolute encoder 1 - used as an incremental encoder 2 - used as absolute encoder, ignoring multiturn overflow alarm	-	1	0~2	●	1 3 5 6 7 8 9 10
80	Thermal Power Protection of Motor 0-current protection 1-Average Thermal Power Protection 2-Analog Thermal Power Protection	-	2	0~2	●	1 3 5 6 7 8 9 10
92	32-bit electronic gear ratio numerator.	-	1	1~9999	○	5 6
93	~ take effect when P0-11~P0-14 is 0. P0-92*1 + P0-93 *10000			1~65535		
94	32-bit electronic gear ratio denominator.	-	1	1~9999	○	5 6
95	~ take effect when P0-11~P0-14 is 0. P0-94*1 + P0-95 *10000			1~65535		

P1-XX:

P1-	Function	Unit	Default value	Range	Effective	Suitable mode
00	First speed loop gain	0.1Hz	According to the model	10~20000	√	3 5 6 7 8 9 10
01	Integral Time Constant of the First Speed Loop	0.01ms	According to the model	15~51200	√	3 5 6 7 8 9 10
02	First position loop gain	0.1/s	According to the model	10~20000	√	3 5 6 7 8 9 10

P1-	Function	Unit	Default value	Range	Effective	Suitable mode
10	Speed feedforward gain	1%	0	0~300	√	5 6 7 8 9 10
11	Speed feedforward filter time	0.01ms	50	0~10000	√	5 6 7 8 9 10
14	Gain switching mode setting	-	0	0~0x00A2	√	1 2 3 4 5 6 7 8 9 10
15	Gain switching waiting time	-	5	0~1000	√	1 2 3 4 5 6 7 8 9 10
16	Gain switching level threshold	-	50	0~20000	√	1 2 3 4 5 6 7 8 9 10
17	Hysteresis of gain switching level threshold	-	30	0~20000	√	1 2 3 4 5 6 7 8 9 10
18	Position loop gain switching time	-	3	0~1000	√	1 2 3 4 5 6 7 8 9 10
22	Speed Instruction Filter Selection 0-first order low pass filter 1-Smooth Average Filter	-	0	0~1	○	3 7
23	speed instruction filter time	0.1ms	0	0~65535	○	3 7
24	position instruction first order low pass filter time	0.1ms	0	0~65535	△	5 6 10
25	position instruction smooth filter time	0.1ms	0	0~65535	△	5 6 10
74	Encoder zero offset detection cycle	-	1000	0~65535	√	1 2 3 4 5 6 7 8 9 10
75	Encoder zero offset detection threshold	-	10	0~500	√	1 2 3 4 5 6 7 8 9 10

P2-XX:

P2-	Function	Unit	Default value	Range	Effective	Suitable mode
00.0	Disturbance observer switch 0- OFF 1- ON	-	1	0~1	○	1 3 5 6 7 8 9 10
01.0	Adaptive mode switch 0-OFF	-	3KW and below: 0	0~1	●	1 3 5 6 7 8 9 10

P2-	Function	Unit	Default value	Range	Effective	Suitable mode
	1-ON		Others: 1			
01.1	Adaptive level 0-high response 1-low noise	-	Set as the model	0~1	●	1 3 5 6 7 8 9 10
02.0	Auto-tuning mode 1-soft 2-fast positioning 3-fast positioning, control the overshoot	-	3	1~3	√	1 3 5 6 7 8 9 10
02.2	Load type (valid only during auto-tuning) 1- synchronous belt 2- screw rod 3-Rigid Connection	-	2	1~3	√	1 3 5 6 7 8 9 10
03.3	Adaptive load type 0-Small Inertia Mode 1-Large Inertia Mode	-	0	0~1	●	1 3 5 6 7 8 9 10
05	Adaptive mode speed loop gain (standard)	0.1Hz	Set as the model	1~65535	○	1 3 5 6 7 8 9 10
07	Adaptive mode inertia ratio (standard)	%	0	0~10000	○	1 3 5 6 7 8 9 10
08	Gain of adaptive mode speed observer (standard)	Hz	Set as the model	10~1000	○	1 3 5 6 7 8 9 10
12	Maximum Inertia Ratio of Adaptive Mode (Standard)	-	30	1~10000	○	1 3 5 6 7 8 9 10
15	Internal command self-tuning maximum stroke	0.01r	100	1~3000	√	1 3 5 6 7 8 9 10
	Inertia identification maximum stroke			1~300		
16	Rotor inertia coefficient of	-	100	10~1000	○	1 2 3 4 5 6 7 8 9

P2-	Function	Unit	Default value	Range	Effective	Suitable mode
	adaptive mode motor					10
17	Maximum Speed of Inertia Identification and Internal Instruction Auto-tuning	-	0	0~65535	√	1 3 5 6 7 8 9 10
18	Initial Inertia Ratio of Inertia Identification	%	500	1~20000	√	1 3 5 6 7 8 9 10
19	Adaptive mode bandwidth	%	Set as the model	1~100	○	1 3 5 6 7 8 9 10
35	Torque Instruction Filtering Time Constant 1	0.01ms	100	0~65535	√	1 3 5 6 7 8 9 10
36	Torque Instruction Filtering Time Constant 2	0.01ms	100	0~65535	√	1 3 5 6 7 8 9 10
41	Disturbance Torque Compensation Coefficient (Non-adaptive Mode Effective)	%	Set as the model	0~100	√	1 3 5 6 7 8 9 10
47.0	Model Loop Switch 0-OFF 1-ON	-	Set as the model	0~f	√	3 4 5 6 7 10
49	Model loop gain	0.1Hz	500	10~20000	√	3 4 5 6 7 10
60.0	Active Vibration Suppression Switch 0-OFF 1-ON	-	0	0~1	√	3 4 5 6 7 10
60.1	Active Suppression Auto-tuning Switch 0-Active Vibration Suppression is not Configured in auto-tuning 1- configure the Active Vibration Suppression when auto-tuning	-	1	0~1	√	3 4 5 6 7 10
61	Active Vibration Suppression frequency	0.1Hz	1000	10~20000	√	1 3 5 6 7 8 9 10

P2-	Function	Unit	Default value	Range	Effective	Suitable mode
62	Active Vibration Suppression gain	%	100	1~1000	√	1 3 5 6 7 8 9 10
63	Active Vibration Suppression damping	%	100	0~300	√	1 3 5 6 7 8 9 10
64	Active Vibration Suppression frequency 1	-	0	-5000~5000	√	1 3 5 6 7 8 9 10
65	Active Vibration Suppression frequency 2	-	0	-5000~5000	√	1 3 5 6 7 8 9 10
66	The second group of active vibration suppression damping	-	0	0~1000	√	1 2 3 4 5 6 7 8 9 10
67	The second group of active vibration suppression frequencies	-	20000	10~50000	√	1 2 3 4 5 6 7 8 9 10
69.0	Notch filter 1 switch	-	0	0~1	√	1 3 5 6 7 8 9 10
69.1	Notch filter 2 switch	-	0	0~1	√	1 3 5 6 7 8 9 10
69.3	Notch filter 3 switch	-	0	0~1	√	1 3 5 6 7 8 9 10
70.0	Notch filter 4 switch	-	0	0~1	√	1 3 5 6 7 8 9 10
70.1	Notch filter 5 switch	-	0	0~1	√	1 3 5 6 7 8 9 10
71	First notch frequency	Hz	5000	50~5000	√	1 3 5 6 7 8 9 10
72	First notch attenuation	0.1dB	70	50~1000	√	1 3 5 6 7 8 9 10
73	First notch band width	Hz	0	0~1000	√	1 3 5 6 7 8 9 10
74	Second notch frequency	Hz	5000	50~5000	√	1 3 5 6 7 8 9 10
75	Second notch attenuation	0.1dB	70	50~1000	√	1 3 5 6 7 8 9 10
76	Second notch band width	Hz	0	0~1000	√	1 3 5 6 7 8 9 10
77	Third notch frequency	Hz	5000	50~5000	√	1 3 5 6 7 8 9 10
78	Third notch attenuation	0.1dB	70	50~1000	√	1 3 5 6 7 8 9 10
79	Third notch band width	Hz	0	0~1000	√	1 3 5 6 7 8 9 10
80	Fourth notch frequency	Hz	5000	50~5000	√	1 3 5 6 7 8 9 10
81	Fourth notch attenuation	0.1dB	70	50~1000	√	1 3 5 6 7 8 9 10
82	Fourth notch band width	Hz	0	0~1000	√	1 3 5 6 7 8 9 10

P2-	Function	Unit	Default value	Range	Effective	Suitable mode
83	Fifth notch frequency	Hz	5000	50~5000	√	1 3 5 6 7 8 9 10
84	Fifth notch attenuation	0.1dB	70	50~1000	√	1 3 5 6 7 8 9 10
85	Fifth notch band width	Hz	0	0~1000	√	1 3 5 6 7 8 9 10

P3-XX:

P3-	Function	Unit	Default value	Range	Effective	Suitable mode
05	Preset speed 1	rpm	0	-9999~9999	√	3
06	Preset speed 2	rpm	0	-9999~9999	√	3
07	Preset speed 3	rpm	0	-9999~9999	√	3
09	Acceleration time	ms	200	0~65535	○	3 7
10	Deceleration time	ms	200	0~65535	○	3 7
11	Speed command smooth average filtering time	ms	0	0~65535	√	1 2 3 4 5 6 7 8 9 10
12	Zero-speed clamping mode	-	0	0~3	○	3 7
13	Zero-speed clamping speed	rpm	10	0~300	○	3 7
14	Forward Maximum Speed Instruction Limit	rpm	4000	0~10000	○	3 5 6 7 10
15	Reverse Maximum Speed Instruction Limit	rpm	4000	0~10000	○	3 5 6 7 10
16	Internal Forward Speed Limitation in Torque Control	rpm	2000	5~10000	√	1
17	Internal Reverse Speed Limitation in Torque Control	rpm	2000	5~10000	√	1
18	Jogging speed	rpm	100	0~1000	○	1 3 5 6 7 8 9 10
19	forward warning speed	rpm	3000	0~10000	○	1 3 5 6 7 8 9 10
20	reverse warning speed	rpm	3000	0~10000	○	1 3 5 6 7 8 9 10
21	forward alarming speed	rpm	4000	0~10000	○	1 3 5 6 7 8 9 10
22	reverse alarming speed	rpm	4000	0~10000	○	1 3 5 6 7 8 9 10

P3-	Function	Unit	Default value	Range	Effective	Suitable mode
28	Internal forward torque limit	%	300	0~1000	√	1 2 3 4 5 6 7 10
29	Internal reverse torque limit	%	300	0~1000	√	1 2 3 4 5 6 7 10
30	external forward torque limit	%	300	0~1000	√	1 2 3 4 5 6 7 10
31	external reverse torque limit	%	300	0~1000	√	1 2 3 4 5 6 7 10
32	Brake torque	1%	100	0~1000	√	1 2 3 4 5 6 7 10
33	Preset torque	%	0	-1000~1000	√	1
38	Anti-blocking forward torque limit	%	300	0~1000	√	1 2 3 4 5 6 7 8 9 10
39	Anti-blocking reverse torque limit	%	300	0~1000	√	1 2 3 4 5 6 7 8 9 10
45	Torque mode switching delay	ms	40	0~9999	√	1 2

P4-XX:

P4-	Function	Unit	Default value	Range	Effective	Suitable mode
00.0	Z phase signal numbers The Z phase signal numbers after leaving the limit switch (note: stop when N+1 Z phase signal reached)	piece	2	0~f	○	5 6 10
00.1	Search the origin function 0-OFF 1-ON	-	0	0~1	○	5 6 10
00.2	return to zero overrun prohibition 0-not prohibit 1-prohibit	-	0	0~1	○	5 6 10
01	Speed of hitting the proximity switch	rpm	600	0~65535	○	5 6 10
02	Speed of leaving proximity switch	rpm	100	0~65535	○	5 6 10
03.0	Internal Location Given Mode Sets Location Mode 0-relative positioning 1-Absolute positioning	-	0	0~1	○	5

P4-	Function	Unit	Default value	Range	Effective	Suitable mode
03.1	<p>Step change mode is set for the given mode of internal position</p> <p>0 - step change when the signal is on, which can be cycled</p> <p>1 - the rising edge of the signal changes steps and is executed in one step</p> <p>2 - the rising edge of the signal starts, and all are executed in sequence without circulation</p> <p>3 - Communication setting segment number</p> <p>4 - / CHSTP double edge trigger</p> <p>5-terminal / PREFA (P5-57), / PREFB (P5-58), / PREFC (P5-59) select the segment number, and 1 ~ 3 segments can be selected</p> <p>6-mode 7: terminal / PREFA (P5-57), / PREFB (P5-58), / PREFC (P5-59), / PREFD (P5-60) selects segment number, and 1 ~ 8 segments (3370 version and before) are optional</p> <p>Terminal / PREFA (P5-57), / PREFB (P5-58), / PREFC (P5-59), / PREFD (P5-60) select the segment number, and 1 ~ 16 segments (3740 version and later) can be selected</p>	-	0	0~6	○	5
03.2	<p>Internal position mode sets waiting mode</p> <p>0-wait positioning completion</p> <p>1-not wait positioning completion</p>	-	0	0~1	○	5
04	Valid segment number	-	0	0~35	○	5
08	Internal location mode start segment number	-	1	0~35	○	5
10~11	First segment pulse	1pul	0	- 327689999 ~3276799 99	√	5

P4-	Function	Unit	Default value	Range	Effective	Suitable mode
12	First segment speed	0.1rpm	0	0~65535	√	5
13	First segment acceleration time	1ms	0	0~65535	√	5
14	First segment deceleration time	1ms	0	0~65535	√	5
16	Adjusting time	1ms	0	0~65535	√	5
10+(n-1)*7~11+(n-1)*7	segment 1 to 35 pulse parameters (n is segment number)	-	-	-	√	5

P5-XX:

P5-	Function	Unit	Default value	Range	Effective	Suitable mode
00	Positioning completion width/COIN	Command unit	11	1~65535	√	5 6 10
01	Location Completion Detection Mode	-	0	0~3	√	5 6 10
02	Location completion retention time	ms	0	0~65535	√	5 6 10
03	Rotation Detection Speed	rpm	50	0~10000	√	1 3 5 6 7 8 9 10
04	Same speed detection speed	rpm	50	0~10000	√	1 3 5 6 7 8 9 10
05	Reached detection speed	rpm	1000	0~10000	√	1 3 5 6 7 8 9 10
06	Positioning near output width	Command unit	50	1~65535	√	5 6 10
07	Servo OFF delay time	ms	500	-500~9999	○	1 3 5 6 7 8 9 10
08	Brake instruction output speed	rpm	30	20~10000	○	1 3 5 6 7 8 9 10
09	Brake instruction waiting time	ms	500	0~65535	○	1 3 5 6 7 8 9 10
10	user-defined output 1 trigger condition	-	0	0~ffff	√	1 3 5 6 7 8 9 10
11	Set a value that compares with the trigger condition of custom output 1	Related to trigger conditions	0	-9999~9999	√	1 3 5 6 7 8 9 10
12	Select custom output 1 mode	-	0	0~3	√	1 3 5 6 7 8 9 10
13	Setting custom output 1 hysteresis	Related to	0	0~65535	√	1 3 5 6 7 8 9 10

P5-	Function	Unit	Default value	Range	Effective	Suitable mode
		trigger conditions				
14	Custom Output 2 Trigger Condition	-	0	0~ffff	√	1 3 5 6 7 8 9 10
15	Set a value that compares with the trigger condition of custom output 2	Related to trigger conditions	0	-9999~9999	√	1 3 5 6 7 8 9 10
16	Select custom output 2 mode	-	0	0~3	√	1 3 5 6 7 8 9 10
17	Setting custom output 2 hysteresis	Related to trigger conditions	0	0~65535	√	1 3 5 6 7 8 9 10
18	IO Filtering time multiple	-	1	0~10000	√	1 3 5 6 7 8 9 10
19	Z phase output maintain time	ms	2	1~65535	√	1 3 5 6 7 8 9 10
20.0~1	/S-ON: servo signal 00: Set the signal to be invalid all the time. 01: Input positive signal from SI1 terminal. 02: Input positive signal from SI2 terminal. 03: Input positive signal from SI3 terminal. 04: Input positive signal from SI4 terminal. 10: Set the signal to always be "valid". 11: Inverse signal is input from SI1 terminal. 12: Inverse signal is input from SI2 terminal. 13: Inverse signal is input from SI3 terminal. 14: Inverse signal is input from SI4 terminal.	-	01	0~ff	√	1 3 5 6 7 8 9 10
20.2	SI terminal filtering time	ms	0	0~f	√	1 3 5 6 7 8 9 10
21.0~1	/P-CON proportion action instruction	-	00	0~ff	√	1 3 5 6 7 8 9 10
21.2	SI terminal filtering time	ms	0	0~f	√	1 3 5 6 7 8 9 10

P5-	Function	Unit	Default value	Range	Effective	Suitable mode
22.0~1	/P-OT: Forbidden forward driving	-	03	0~ff	√	1 3 5 6 7 8 9 10
22.2	SI terminal filtering time	ms	0	0~f	√	1 3 5 6 7 8 9 10
23.0~1	/N-OT: forbidden reverse driving	-	04	0~ff	√	1 3 5 6 7 8 9 10
23.2	SI terminal filtering time	ms	0	0~f	√	1 3 5 6 7 8 9 10
24.0~1	/ALM-RST: alarm clear	-	02	0~ff	√	1 3 5 6 7 8 9 10
24.2	SI terminal filtering time	ms	0	0~f	√	1 3 5 6 7 8 9 10
25.0~1	/P-CL: External Torque Limitation at Forward Rotation Side	-	00	0~ff	√	1 3 5 6 7 8 9 10
25.2	SI terminal filtering time	ms	0	0~f	√	1 3 5 6 7 8 9 10
26.0~1	/N-CL: External Torque Limitation at Reverse Rotation Side	-	00	0~ff	√	1 3 5 6 7 8 9 10
26.2	SI terminal filtering time	ms	0	0~f	√	1 3 5 6 7 8 9 10
27.0~1	/SPD-D: Internal Speed Direction Selection	-	00	0~ff	√	1 2 3 4 7
27.2	SI terminal filtering time	ms	0	0~f	√	1 2 3 4 7
28.0~1	/SPD-A: Internal Setting Speed Selection	-	00	0~ff	√	3 5
28.2	SI terminal filtering time	ms	0	0~f	√	3 5
29.0~1	/SPD-B: Internal Setting Speed Selection	-	00	0~ff	√	3 5
29.2	SI terminal filtering time	ms	0	0~f	√	3 5
30.0~1	/C-SEL: control mode selection	-	00	0~ff	√	1 3 5 6 7 8 9 10
30.2	SI terminal filtering time	ms	0	0~f	√	1 3 5 6 7 8 9 10
31.0~1	/ZCLAMP: zero position clamping	-	00	0~ff	√	3 4 7
31.2	SI terminal filtering time	ms	0	0~f	√	3 4 7
32.0~1	/INHIBIT: Instruction pulse prohibition	-	00	0~ff	√	5 6 7
32.2	SI terminal filtering time	ms	0	0~f	√	5 6 7
34.0~1	/CLR: pulse offset clear	-	00	0~ff	√	5 6 10
34.2	SI terminal filtering time	ms	0	0~f	√	5 6 10
35.0~1	/CHGSTP: internal position mode change step signal	-	00	0~ff	√	5

P5-	Function	Unit	Default value	Range	Effective	Suitable mode
35.2	SI terminal filtering time	ms	0	0~f	√	5
36.0~1	/I-SEL: inertia ratio switching	-	00	0~ff	√	1 3 5 6 7 8 9 10
36.2	SI terminal filtering time	ms	0	0~f	√	1 3 5 6 7 8 9 10
37	/COIN_HD: Location Completion Maintenance 00: No output to terminal 01: Output positive signal from SO1 terminal 02: Output positive signal from SO2 terminal 03: Output positive signal from SO3 terminal 11: Output reverse signal from SO1 terminal 12: Output reverse signal from SO2 terminal. 13: Output reverse Signal from SO3 terminal	-	0000	0~ffff	√	5 6 10
38	/COIN: positioning completion	-	0001	0~ffff	√	5 6 10
39	/V-CMP: same speed detection	-	0000	0~ffff	√	3 4 7
40	/TGON: rotation detection	-	0000	0~ffff	√	1 3 5 6 7 8 9 10
41	/S-RDY: ready	-	0000	0~ffff	√	1 3 5 6 7 8 9 10
42	/CLT: torque limit	-	0000	0~ffff	√	1 3 5 6 7 8 9 10
43	/VLT: speed limit detection	-	0000	0~ffff	√	1 2
44	/BK: brake locking	-	0000	0~ffff	○	1 3 5 6 7 8 9 10
45	/WARN: warning	-	0000	0~ffff	√	1 3 5 6 7 8 9 10
46	/NEAR: near	-	0000	0~ffff	√	5 6 10
47	/ALM: alarm	-	0002	0~ffff	√	1 3 5 6 7 8 9 10
48	/Z: encoder Z phase signal output	-	0000	0~ffff	√	1 3 5 6 7 8 9 10

P5-	Function	Unit	Default value	Range	Effective	Suitable mode
49	/XNETERR: Xnet error signal	-	0	0~ffff	√	10
50	/MRUN: internal position mode motion starting signal	-	0000	0~ffff	√	5
51	/V-RDY: speed reached	-	0000	0~ffff	√	3 4 7
52	/USER1: user-defined output 1	-	0000	0~ffff	√	1 3 5 6 7 8 9 10
53	/USER2: user-defined output 2	-	0000	0~ffff	√	1 3 5 6 7 8 9 10
57.0~1	/PREFA: internal position selection signal A	-	00	0~ff	√	5

P5-	Function	Unit	Default value	Range	Effective	Suitable mode
57.2	SI terminal filtering time	ms	0	0~f	√	5
58.0~1	/PREFB: internal position selection signal B	-	00	0~ff	√	5
58.2	SI terminal filtering time	ms	0	0~f	√	5
59.0~1	/PREFC: internal position selection signal C	-	00	0~ff	√	5
59.2	SI terminal filtering time	ms	0	f~f	√	5
60.0~1	/SYNC: (Modbus analog motion bus) update instruction	-	00	0~ff	√	5
60.2	SI terminal filtering time	ms	0	0~f	√	5
61.0~1	/TRAJ-START: Motion start trigger signal	-	00	0~ff	√	5
61.2	SI terminal filtering time	ms	0	0~f	√	5
70	/SRDY: Output Conditions Selection 0: This terminal is turned on after initialization of the driver is completed 1: This terminal will not turn on until enabled.	-	0	0~1	√	1 3 5 6 7 8 9 10
71	Function Selection of Directional Terminal of Pulse Speed Mode	-	0	0~1	○	7

P6-XX:

P6-	Function	Unit	Default value	Range	Effective	Suitable mode
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05	Adaptive Mode Speed Loop Gain (Large Inertia)	0.1Hz	According to the model	1~65535	○	1 3 5 6 7 8 9 10
07	Adaptive mode inertia ratio (Large inertia)	%	According to the model	0~10000	○	1 3 5 6 7 8 9 10
08	Gain of adaptive mode speed observer (large inertia)	Hz	According to the model	10~1000	○	1 3 5 6 7 8 9 10
12	Maximum Inertia Ratio of Adaptive Mode (Large Inertia)	-	According to the model	1~10000	○	1 3 5 6 7 8 9 10

P7-XX:

P7-	Function	Unit	Default value	Range	Effective	Suitable mode
00	RS485 station no.	-	1	0~100	○	1 3 5 6 7 8 9 10
01.0~1	RS485 baud rate 00: 300 01: 600 02: 1200 03: 2400 04: 4800 05: 9600 06: 19200 07: 38400 08: 57600 09: 115200 0A: 192000 0B: 256000 0C: 288000 0D: 384000 0E: 512000 0F: 576000 10: 768000 11: 1M	Baud rate	06	0~16	○	1 3 5 6 7 8 9 10

P7-	Function	Unit	Default value	Range	Effective	Suitable mode
	12: 2M 13: 3M 14: 4M 15: 5M 16: 6M					
01.2	RS485 stop bit 0: 2 bits 2: 1 bit	Stop bit	2	0~2	○	1 3 5 6 7 8 9 10
01.3	RS485 parity bit 0-no parity 1-odd parity 2-even parity	Parity bit	2	0~2	○	1 3 5 6 7 8 9 10
02	RS485 communication protocol 1-Modbus Rtu protocol 2-Xnet bus protocol 3-read Xnet bus torque	-	1	1~255	○	1 3 5 6 7 8 9 10
03	Xnet Synchronized sampling time	1ms	9	1~500	○	10
04	Xnet slave station data	-	15	1~500	○	10
05	Xnet slave station numbers	-	10	1~20	○	10
06	Number of communication overtime retries	times	10	1~500	○	10
07	Bus instruction refresh cycle	1us	3000	1~65535	○	10
08	Compensation Threshold of Position Deviation	-	0	0~0	√	10
09	Compensation times for Position Deviation	-	0	0~0	√	10
10	RS232 station no.	-	1	0~100	○	1 2 3 4 5 6 7 10
11.0~1	RS232 baud rate	Baud rate	06	0~16	√	1 2 3 4 5 6 7 10

P7-	Function	Unit	Default value	Range	Effective	Suitable mode
	00: 300 01: 600 02: 1200 03: 2400 04: 4800 05: 9600 06: 19200 07: 38400 08: 57600 09: 115200 0A: 192000 0B: 256000 0C: 288000 0D: 384000 0E: 512000 0F: 576000 10: 768000 11: 1M 12: 2M 13: 3M 14: 4M 0F: 576000 10: 768000 11: 1M 12: 2M 13: 3M 14: 4M 15: 5M 16: 6M					
11.2	RS232 stop bit 0: 2-bit	Stop bit	2	0~2	√	1 2 3 4 5 6 7 10

P7-	Function	Unit	Default value	Range	Effective	Suitable mode
	2: 1 bit					
11.3	RS232 parity bit 0-no parity 1-odd parity 2-even parity	Parity bit	2	0~2	√	1 2 3 4 5 6 7 10
20	Return to zero direction (bus)	-	1	-9999~9999	√	10
21	Filtering time after return to zero(bus)	ScanA Cycle	400	1~65535	√	10

P8-XX:

P8-	Function	Unit	Default value	Range	Effective	Suitable mode
25	Direct display content setting when the panel is powered on	-	0	0~2	▲	1 2 3 4 5 6 7 8 9 10

P9-XX:

P9-	Function	Unit	Default value	Range	Effective	Suitable mode
11.0	Number of Z phases found when back to the origin	-	0	0~f	○	5 6
11.1	Trigger mode of new return to origin 0 - it is forbidden to trigger back to the original point 1 - trigger return to origin through SI terminal 0-2 - return to the original point immediately after enabling	-	0	0~2	○	5 6
11.2	0 - new homing mode 0 1 - return to origin mode 1	-	0	0~7	○	5 6

P9-	Function	Unit	Default value	Range	Effective	Suitable mode
	2- return to origin mode 2 3 - return to origin mode 3 4 - return to origin mode 4 5 - return to origin mode 5 6 - return to origin mode 6 7 - return to origin mode 7					
11.3	Deceleration mode in case of overtravel signal	-	0	0~1	○	5/6
12	Homing high speed	-	200	0~3000	○	5/6
13	Homing low speed	-	20	0~1000	○	5/6
14	Homing acc/dec time	-	1000	0~5000	○	5/6
15	Homing timeout time	-	0	0~12000	○	5/6
16	Touch stop homing speed threshold	-	2	0~1000	○	5/6
17	Touch stop homing torque threshold	-	100	0~300	○	5/6
18	Touch stop homing time threshold	-	500	10~1500	○	5/6
19	Number of quantitative pulses low bit	-	0	-9999~9999	○	5/6
20	Number of quantitative pulses high bit	-	0	-9999~9999	○	5/6
21	Homing selection	-	0	0~1	●	5/6
22	Homing end filter time	-	500	50~10000	○	5/6

7-2.Monitoring status parameters

U0-XX:

Code	Content		Unit
U0-00	servo motor speed		Rpm
U0-01	Input speed instruction		Rpm
U0-02	Torque instruction		% rated
U0-03	Mechanical angle		1°
U0-04	Electric angle		1°
U0-05	Bus voltage		V
U0-06	IPM temperature		0.1℃
U0-07	Torque feedback		% rated
U0-08	pulse offset	(0000~9999) *1	Instruction pulse
U0-09		(0000~9999) *10000	
U0-10	Encoder feedback	(0000~9999) *1	Encoder pulse
U0-11		(0000~65535) *10000	
U0-12	input instruction pulse	(0000~9999) *1	Instruction pulse
U0-13	numbers	(0000~9999) *10000	
U0-14	position feedback	(0000~9999) *1	Instruction pulse
U0-15		(0000~9999) *10000	
U0-16	encoder accumulated	(0000~9999) *1	Encoder pulse
U0-17	position	(0000~9999) *10000	
U0-18	Torque current		0.01A
U0-19	Analog input V-REF value		0.001V
U0-20	Analog input T-REF value		0.001V
U0-21	Input signal status 1		
U0-22	Input signal status 2		
U0-23	output signal status 1		
U0-24	ouput signal status 2		
U0-25	Input pulse frequency	(0000~9999) *1	Hz
U0-26		(0000~9999) *10000	
U0-41	Instantaneous output power		1W

Code	Content	Unit
U0-42	Average output power	1W
U0-43	Instantaneous thermal power	1W
U0-44	average thermal power	1W
U0-49	position feedforward	1 command unit
U0-50	speed feedforward	rpm
U0-51	torque feedforward	% rated
U0-52	Instantaneous Bus Capacitor Power	1W
U0-53	Average Bus Capacitor Power	1W
U0-54	Encoder error count	-
U0-55	Discharge power of instantaneous regenerative braking	1W
U0-56	Average regenerative brake discharge power	1W
U0-57	Absolute encoder present position feedback low 32-bit	Encoder position
U0-58		
U0-59	Absolute encoder present position feedback high 32-bit	Encoder position
U0-60		
U0-61	Xnet communication error amounts	-
U0-62	Xnet Communication Waiting Synchronization Frame State Interference	-
U0-63	Xnet Communication Waiting for Synchronization Frame State Receiving Data Frame	-
U0-64	Xnet Communication Waiting Data Frame State Interference	-
U0-65	Xnet Communication Waiting for Data Frame Status Receive Synchronized Frame	-
U0-66	Xnet communication CRC parity error	-
U0-67	Xnet communication UART error	-
U0-68	Xnet communication timeout counting	-
U0-69	communication encoder timeout counting	-
U0-79	Encoder CRC error count	-
U0-80	Internal location mode error segment number	-
U0-81	Current segment number of internal location mode	-
U0-82	Analog input V-REF original value	-
U0-83	Analog input T-REF original value	-

Code	Content	Unit
U0-88	Read and write motor parameter result flag	-
U0-89	Real-time speed feedback (displaying range -99.99~99.99rpm)	0.01rpm
U0-90	Maximum deviation of enabling position under static state	-
U0-91	Multi-turn absolute motor circles	
U0-94	Encoder feedback position after calibration	(0000~65536) *1
U0-95		(0000~65536) *2^16
U0-96		(0000~65536) *2^32
U0-97		(0000~65536)
U0-98	High power motor temperature	0.1℃

U1-XX:

Code	Content	Unit
U1-00	present alarm code	
U1-01	present warning code	
U1-02	U phase current when alarming	0.01A
U1-03	V phase current when alarming	0.01A
U1-04	bus voltage when alarming	V
U1-05	IGBT temperature when alarming	0.1℃
U1-06	torque current when alarming	0.01A
U1-07	excitation current when alarming	A
U1-08	position offset when alarming	Command pulse
U1-09	speed when alarming	rpm
U1-10	Seconds(low 16-bit) when alarming, cumulated seconds from the first time power-on	s
U1-11	Seconds(high 16-bit) when alarming, cumulated seconds from the first time power-on	s
U1-12	this time running error numbers, counting after power on this time	
U1-13	this time operation warning numbers, counting after power on this time	
U1-14	historical alarm amounts	
U1-15	historical warning amounts	
U1-16	Recent 2nd alarm code	
U1-17	Recent 3rd alarm code	

Code	Content	Unit
U1-18	Recent 4th alarm code	
U1-19	Recent 5th alarm code	
U1-20	Recent 6th alarm code	
U1-21	Recent 7th warning code	
U1-22	Recent 8th warning code	
U1-23	Recent 9th warning code	
U1-24	Recent 10th warning code	
U1-25	Recent 11 th warning code	
U1-26	Recent 12 th warning code	

U2-XX:

Code	Content	Unit
U2-00	Power on times	
U2-01	series	
U2-02	Model (low 16-bit)	
U2-03	Model (high 16-bit)	
U2-04	out of factory date: year	
U2-05	out of factory date: month	
U2-06	out of factory date: day	
U2-07	Firmware version	
U2-08	Hardware version	
U2-09	Total running time (from the first time power on)	hour
U2-10	Total running time (from the first time power on)	minute
U2-11	Total running time (from the first time power on)	second
U2-12	This time running time (from this time power on)	hour
U2-13	This time running time (from this time power on)	minute
U2-14	This time running time (from this time power on)	second
U2-15	Average output power (from the first time enabled, average power in the process of enabling)	1W
U2-16	Average thermal power (from the first time enabled, average power in the process of enabling)	1W
U2-17	Average bus capacitor filter power (from the first time power on, average	1W

Code	Content		Unit
	power in the process of power on)		
U2-18	Cumulative turns of motor	(0000~9999) *1	Turn
U2-19		(0000~9999) *10000	Turn
U2-20	Device serial no.: low 16-bit		-
U2-21	Device serial no.: high 16-bit		-
U2-22	Firmware generation date: year		-
U2-23	Firmware generation date:month/day		-
U2-24	Firmware generation date: hour/minute		-

U3-XX:

Code	Content	Unit
U3-00	Drive automatically read motor code (including thermal power parameters)	-
U3-01	Motor version	-
U3-02	Encoder version	-
U3-70	Automatically read the motor code of the encoder in the motor parameters (only related to the motor code)	-

U4-XX:

Code	Content	Unit
U4-10	Resonance frequency detected by fast FFT	Hz
U4-16	Cumulative value of continuous overload operation of thermal power protection (supported by 3770 version and later)	-
U4-17	Cumulative value of instantaneous overload operation of thermal power protection (supported by 3770 version and later)	-

7-3.Auxiliary parameter list

Function code	Explanation
F0-00	Clear the alarm
F0-01	Restore to out of factory settings
F0-02	clear the position offset
F0-07	Panel inertia identification
F0-08	Panel external command self-tuning
F0-09	Panel internal command self-tuning
F0-10	Panel vibration suppression 1
F0-11	Panel vibration suppression 2
F0-12	Panel vibration suppression (fast FFT)
F1-00	Jog operation
F1-01	Test run
F1-02	Current Sampling Zero-correction
F1-05	software enable
F1-06	Absolute encoder position clear
F2-09	Set segment no. through communication

Appendix

Appendix 1.Parameter Modbus address list

■ Parameter address

Parameter	Modbus address	Notes
P0-00~P0-xx	0x0000~0x0063	Modbus address is added 1 in turn from 0x0000, for example, Modbus address of P0-23 is 0x0017
P1-00~P1-xx	0x0100~0x0163	Modbus address is added 1 in turn from 0x0100, for example, Modbus address of P1-10 is 0x010A
P2-15~P2-xx	0x020F~0x0263	Modbus address is added 1 in turn from 0x020F, for example, Modbus address of P2-16 is 0x0210
P3-00~P3-xx	0x0300~0x0363	Modbus address is added 1 in turn from 0x0300, for example, Modbus address of P3-13 is 0x030D
P4-00~P4-xx	0x0400~0x0463	Modbus address is added 1 in turn from 0x0400, for example, Modbus address of P4-25 is 0x0419
P5-00~P5-xx	0x0500~0x0563	Modbus address is added 1 in turn from 0x0500, for example, Modbus address of P5-20 is 0x0514
P6-00~P6-xx	0x0600~0x0663	Modbus address is added 1 in turn from 0x0600, for example, Modbus address of P6-05 is 0x0605
P7-00~P7-xx	0x0700~0x0763	Modbus address is added 1 in turn from 0x0700, for example, Modbus address of P7-11 is 0x070B
U0-00~U0-xx	0x1000~0x1063	Modbus address is added 1 in turn from 0x1000, for example, Modbus address of U0-05 is 0x1005
U1-00~U1-xx	0x1100~0x1163	Modbus address is added 1 in turn from 0x1100, for example, Modbus address of U1-14 is 0x110E
U2-00~U2-xx	0x1200~0x1263	Modbus address is added 1 in turn from 0x1200, for example, Modbus address of U2-08 is 0x1208
F0-00~F0-xx	0x2000~0x2063	Modbus address is added 1 in turn from 0x2000, for example, Modbus address of F0-01 is 0x2001
F1-00~F1-xx	0x2100~0x2163	Modbus address is added 1 in turn from 0x2100, for example, Modbus address of F1-03 is 0x2103

Appendix 2.Servo debugging steps

- Before power on, conduct preliminary inspection according to the goods inspection described in

the manual to confirm that there is no obvious damage to the equipment.

- When there is no obvious damage, connect the servo driver and servo motor, and connect the power supply. Note that the power supply cannot be wrongly connected. The U, V and W connectors of the power cable must be connected with the U, V and W terminals on the servo driver one by one, and cannot be crossed, otherwise the servo motor will be locked or fly.
- Turn on the power and BB will be displayed on the servo panel;
- After power on again, enter parameter F1-02 for self adjustment of primary current offset. See auxiliary operation for specific operation methods;
- Enter parameter F1-01, long press ENTER, short press ENTER, and then press INC/ DEC to check the operation status of the motor. If the motor can run smoothly, the wiring is normal, and if the motor does not rotate, it is abnormal;
- If the wiring is normal, enter the parameter F1-00 for inching operation. After ensuring that there is no error, install the motor to the mechanical equipment;
- Before officially starting the equipment, set the parameters of the servo driver according to the actual application and adjust them according to the actual application.

Appendix 3.Servo general mode parameters

Basic parameters	
Parameter	Essentials
P0-03 enable mode P5-20 servo ON signal /S-ON	Enable mode selection: generally, P0-03 defaults, and P5-20 sets n.0010 to enable as soon as it is powered on
P0-04 rigidity grade	Adjust servo gain in self-tuning fast adjustment mode
P0-05 definition of rotation direction	Determine the motor direction, generally 0/1 by default
P0-25 discharge resistance power value P0-26 discharge resistance value	Set the specification parameters of external regeneration resistance to ensure that they are the same as the actual ones
P3-28 internal forward torque limit P3-29 internal reverse torque limit P3-30 external forward torque limit P3-31 external reverse torque limit	Set the servo torque limit source and limit value. The default value is in percent of the servo torque
P5-44 power loss brake / BK P5-07 servo off delay time P5-08 brake command output speed P5-09 brake command waiting time	The motor with brake adopts servo SO terminal to control the setting parameters of brake

P5-47 alarm output /ALM	Output alarm function through the setting of SO terminal, the SO2 terminal outputs dynamic closing signal by default
P7-00 RS485 station no. P7-01 communication setting P7-02 RS485 communication protocol	Communication setting related parameters

Common parameters of external pulse position mode	
Parameter	Essentials
P0-01 control mode selection	Set to 6: external pulse mode
P0-10 pulse command form	Set pulse form 0-CW/CCW 1-AB 2-P+D
P0-11 set the number of pulses per motor revolution * 1 P0-12 set the number of pulses per motor revolution * 10000 P0-13 electronic gear ratio (numerator) P0-14 electronic gear ratio (denominator) P0-92 ~ P0-93 32-bit electronic gear ratio numerator P0-94 ~ P0-95 denominator of 32-bit electronic gear ratio	Set the number of command pulses required for one revolution of the motor P0-13 / P0-14 takes effect when P0-11 / P0-12 are all zero When P0-11 ~ P0-14 are all zero, P0-92 ~ P0-95 are effective 32-bit gear ratio numerator: $P0-92 * 1 + P0-93 * 10000$ Denominator of 32-bit gear ratio: $P0-94 * 1 + P0-95 * 10000$
P0-09 pulse command setting	You can set the low-speed pulse command direction and low-speed pulse filtering time respectively

Common parameters of internal position mode	
Parameter	Essentials
P0-01 control mode selection	Set to 5: internal position mode
P4-03 internal position setting mode P4-04 number of valid segments P4-10 ~ P4-254 position parameter setting of internal sections 1 to 35	Control mode setting of internal position mode: including step change mode, positioning mode and adjustment time Configuration of pulse displacement, speed, acceleration and deceleration time at each section

	position
P5-35 step change signal / GHGSTP P5-32 pause current section signal / INHIBIT P5-31 skip current segment number / Z-CLAMP	Common terminal function assignment
P4-00 number of Z-phase signals after leaving the limit switch P4-01 speed of hitting proximity switch P4-02 speed of leaving proximity switch P5-28 locating reference origin at forward rotation side in position mode / SPD-A P5-29 reference origin finding at forward rotation side in position mode / SPD-B	Internal position homing setting parameters
F2-09 Arbitrary setting of 35 sections position	Set section no. through communication

Internal torque control	
Parameter	Essentials
P0-01 control mode selection	Set to 1: internal torque mode
P3-33 Internal torque command setting	The given value is the percentage value of rated torque
P3-16 internal forward speed limit during torque control P3-17 internal reverse speed limit during torque control P3-14 forward maximum speed limit (max speed) P3-15 reverse maximum speed limit (max speed)	Speed limit in torque mode
P5-27 speed direction switching /SPD-D	Commutation, the default is n.0000 If the commutation is given through SI2 terminal, P5-27 can be set to n.0002

Internal speed control	
Parameter	Essentials
P0-01 control mode selection	Set to 3: internal speed control mode
P3-05 internal set speed 1	Speed value setting of internal 3-stage speed, unit: rpm

Internal speed control	
Parameter	Essentials
P3-06 internal set speed 2 P3-07 internal set speed 3	
P5-28 internal speed selection / SPD-A P5-29 internal speed selection / SPD-B	The combination of terminals determines the corresponding section speed
P5-27 internal speed direction selection / SPD-D	Switch direction, the default is n.0000 If the direction changing is set through SI2 terminal, P5-27 can be set to n.0002
P3-09 soft start acceleration time P3-10 soft start deceleration time	Set acceleration and deceleration time in ms

External pulse speed control	
Parameter	Essentials
P0-01 control mode selection	Set to 7: external pulse speed mode
P0-10 pulse command format	Set pulse format 0-CW/CCW 1-AB 2-P+D
P0-15 Command pulse frequency at rated speed	Determine the linear relationship between command pulse frequency and speed
P0-16 Speed command pulse filtering time	When the command pulse frequency is relatively low, properly setting this parameter can reduce the speed fluctuation

Bus mode control (DS5E supported)
Refer to X-Net user manual

Appendix 4. Version 3770 new functions

- ◆ The numerator of electronic gear ratio can be modified in real time in pulse position mode, and it is not allowed to be modified in enable mode in other modes.
- ◆ Improve the homing function, and add 8 modes of homing.
- ◆ Add the second group of gain parameters, and the two groups of gain parameters can be switched.

-
- ◆ The internal speed command S-shaped curve filtering function is added, and the parameter P3-11 is added.
 - ◆ Add Z-phase output function of multiturn motors
 - ◆ Add parameter P8-25. When powered on, the panel directly displays speed or torque feedback according to group P parameter settings:

P8-2 = 0: normal display, as before, power on to display 'BB' or 'run', the default setting;

P8-2 = 1: power on the panel to display the value of U0-00, speed feedback, unit: rpm;

P8-2 = 2: the value of U0-07 displayed on the panel when powered on, torque feedback, unit%;

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