Ver6.3

Servo driver user manual

Safety precautions

To ensure the safe use of this product, the following safety signs must be observed so as to avoid damage to personnel or equipment.

 警告 Notice	Indicates that an error operation can cause danger, mild or moderate bodily harm, damage to equipment, or even fire.
 危险 Danger	Represents an error operation that raises danger, causing injury or death.
	Inhibit operation.
	Indicates that operations must be performed.

After the arrival of the product, the following important matters must be observed when confirming, installing, wiring, running, maintaining and checking the products:

●Notes on installation:

 警告 Notice
It is strictly prohibited to install in humid and corrosive environment, flammable gas environment, near combustible and dust, metal powder environment, otherwise there may be electric shock and fire.

●Precautions for wiring:

 警告 Notice
◢ The ground terminal of the servo driver must be earthed. Otherwise, an electric shock and fire may occur. ◢ Strictly prohibit the servo driver output terminals U, V, W connected to three-phase power supply, otherwise it may hurt and cause fire. ◢ 220V drive is strictly prohibited to connect to the 380V power supply, otherwise you can get an electric shock and a fire. ◢ Make sure the power terminals and motor terminals are tightened, or there may be a fire.

●Considerations for runtime:

 危险 Danger
◢ In operation, it is strictly forbidden to touch any rotating parts, or you may be injured. ◢ In operation, do not touch the motor and drive, or you may be burned.

警告 Notice
◢ Before running, you must select the correct motor type, otherwise, may be injured, damage to equipment. ◢ Before running, you must set the user parameters that suit the application. Otherwise, you may be harmed and damage the equipment. ◢ Before running, make sure that the machine can be stopped at any time, or you may get injured.

●Precautions for maintenance and inspection:

◢ Do not touch the inside of servo drive, or you may get an electric shock. ◢ After closing the power supply, it is strictly forbidden to touch the terminal within 5 minutes. Otherwise, the residual voltage may cause an electric shock. ◢ Disassembly servo motor is not allowed, otherwise it is possible to get an electric shock.

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The first chapter: product inspection and installation

1.1 Product inspection

The products in the factory have done a complete functional test, in order to prevent the process of transporting products caused by negligence are not normal, please check the following items after unpacking:

- Check whether servo drive and servo motors are the same as those ordered.
- Check the servo driver and servo motor for damage and scratching. Please do not wire or send electricity when causing damage in transit.
- Check that the servo drive and servo motor are loose or loose. Is there a loose screw, whether the screws are not locked or broken.
- Check that the rotor shaft of the servo motor can rotate smoothly by hand. The motor with the brake can not be rotated directly.

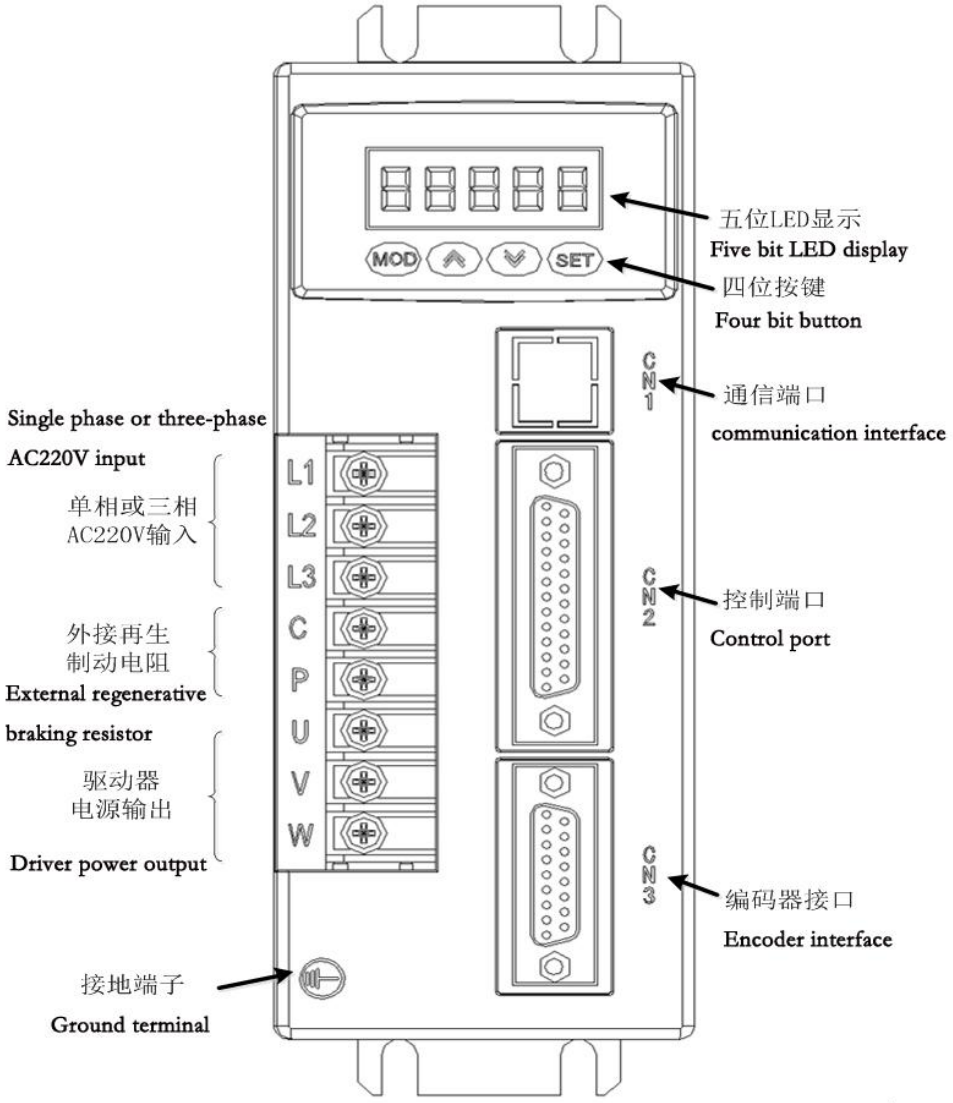
  If any of the above is out of order or abnormal, please contact the distributor immediately.

1.2 id label

Danger: Please follow the instructions, installation, wiring and use, be sure to reliably grounding

High-voltage power supply: Please don't disassemble the driver during the 5 minutes when the power is on and the power is cut off, so as to prevent electric shock

1.3 Product front panel



1.4 Drive specification

Input power		① Single phase or three-phase AC220V -15 to +10% 50 / 60Hz ② Single phase or three-phase AC380V -15 to +10% 50 / 60Hz
environment	temperature	Work: store at 0~55 DEG C: -20 ~ 80 DEG C
	humidity	Less than 90% (without condensation)
	Vibration	Less than 0.5G (4.9m/S2), 10 to 60Hz (non continuous running)
control mode		IGBT PWM 正弦波控制 power pwm 正弦波控制
control model		① Torque mode ④Position / speed mode ② Speed mode ⑤Position / torque model ③ Location mode ⑥Speed / torque mode
control input		Servo enable, alarm reset, forward drive, inhibit and reverse drive prohibited, External forward torque limit, external reverse torque limit, emergency stop, Zero speed clamp, internal speed command select 1, internal speed command select 2Internal speed command select 3, internal torque command select 1, Internal torque command select 2, control mode switching, gain switching, The choice of the electronic gear molecule 1, the electronic gear molecule selection 2, the instruction counter, The position deviation is cleared, the pulse input is forbidden, the proportional control and the origin return trigger, Origin regression reference point, internal position selection 1, internal position selection 2, Trigger an internal position instruction, pause an internal position command, and select an internal and external position commandFixed length, displacement interruption, fixed length unlocking
Control output		Alarm detection, servo ready, emergency stop detection, positioning completed, Speed arrives, arrives at the predetermined torque, the zero speed examination, the servo motor electrify, Electromagnetic brake, origin return, position approach, torque limit, speed limit, Tracking torque command arrives
Encoder feedback		① 2500 line incremental encoder ② 17 bit absolute encoder
communication mode		① RS-232 ②RS-485
Display and operation		① 5 LED display ②4/5 keys
Braking mode		Energy consumption braking by built-in / external braking resistor

Cooling method	Air cooling (heat conduction mould, high speed strong cooling fan)
Power range	≤10KW

1.5 Servo motor installation

Installation environment condition

- Working environment temperature: 0~40 degrees centigrade; working environment temperature: 80% below (without dew).
- Storage environment temperature: -40 ~ 50 degrees; storage environment humidity: less than 80% (without condensation).
- Vibration: 0.5G below.
- Well ventilated place with little moisture and dust.
- non corrosive, fire gases, oil and gas, cutting fluid, iron powder and so on.
- no water vapor and direct sunlight.

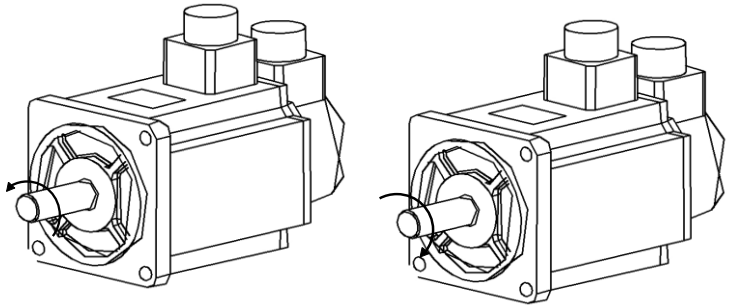
Installation method

- horizontal installation: to avoid water, oil and other liquids from the motor outlet end into the motor, please put cable outlet below.
- Vertical mounting: if the motor shaft is mounted upwards and attached to the reducer, attention shall be paid to preventing the grease in the reducer from penetrating into the motor through the motor shaft.
- The extension of the motor shaft needs to be sufficient. If the amount of the extension is insufficient, it will vibrate easily when the motor is moving.

- The installation and disassembly of the motor, with a hammer percussion motor do not, otherwise easy to cause damage to the motor shaft and the encoder.

1.6 Motor rotation direction

From the motor load side, the motor shaft extends counterclockwise (CCW) for the positive rotation, and the clockwise rotation (CW) is reversed.



正转(CCW)　　反转(CW)

1.7 Servo unit and motor model adaptation

The 220V drive model and the motor model adaptation sheet are as follows:

Motor model	Pn001	Rated speed (r/min)	Rated torque (N.M)	Rated power (KW)	KRS 15	KRS 20A	KRS 30A	KRS 50A	KRS 75A
60st_m00630	0	3000	0.6	0.2	√	√	√		
60st_m01330	1	3000	1.3	0.4	√	√	√		
60st_m01930	2	3000	1.9	0.6	√	√	√		
80st_m01330	3	3000	1.3	0.4	√	√	√		
80st_m02430	4	3000	2.4	0.75	√	√	√		
80st_m03520	5	2000	3.5	0.73	√	√	√		
80st_m04025	6	2500	4	1	√	√	√		
90st_m02430	7	3000	2.4	0.75	√	√	√		
90st_m03520	8	2000	3.5	0.73	√	√	√		
90st_m04025	9	2500	4	1	√	√	√		
110st_m02030	10	3000	2	0.6	√	√	√		
110st_m04020	11	2000	4	0.8	√	√	√		
110st_m04030	12	3000	4	1.2		√	√		

110st_m05030	13	3000	5	1.5			√		
110st_m06020	14	2000	6	1.2	√	√	√		
110st_m06030	15	3000	6	1.8			√		
130st_m04025	16	2500	4	1	√	√	√		
130st_m06015	17	1500	6	1	√	√	√		
130st_m05025	18	2500	5	1.3		√	√		
130st_m06025	19	2500	6	1.5			√		
130st_m07725	20	2500	7.7	2			√		
130st_m10010	21	1000	10	1	√	√	√		
130st_m10015	22	1500	10	1.5		√	√		
130st_m10025	23	2500	10	2.6			√	√	√
130st_m15015	24	1500	15	2.3			√		
130st_m15025	25	2500	15	3.8				√	√
150st_m15025	26	2500	15	3.8				√	√
150st_m15020	27	2000	15	3				√	√
150st_m18020	28	2000	18	3.6				√	√
150st_m23020	29	2000	23	4.7				√	√
150st_m27020	30	2000	27	5.5					√
180st_m17215	31	1500	17.2	2.7				√	√
180st_m19015	32	1500	19	3			√	√	√
180st_m21520	33	2000	21.5	4.5				√	√
180st_m27010	34	1000	27	2.9				√	√
220st_m67010	35	1000	67	7					√
180st_m35015	37	1500	35	5.5					√
40st_m00330	39	3000	0.3	0.1	√	√	√		

The 380V drive model and the motor model adaptation sheet are as follows:

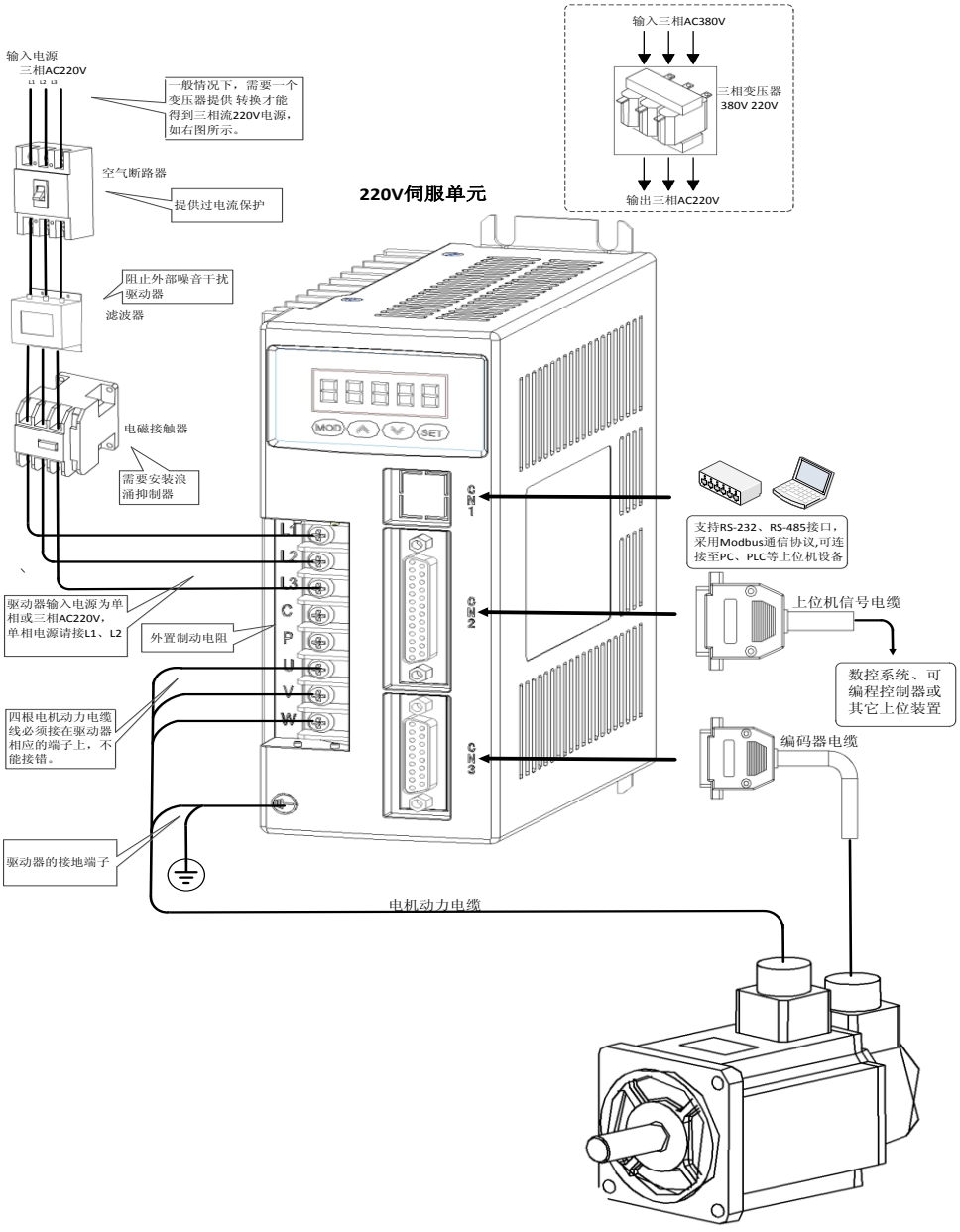
Motor model	Pn001	Rated speed (r/min)	Rated torque (N.M)	Rated power (KW)	KRS 25	KRS 40	KRS 50	KRS 75
180st_m48020	46	2000	48	10			√	√
180st_m19020	47	2000	19	4		√	√	√
180st_m35020	48	2000	35	7.3		√	√	√
180st_m27020	49	2000	27	5.6		√	√	√

180st_m48015	50	1500	48	7.5			√	√
180st_m19015	51	1500	27	3		√	√	√
180st_m21520	52	2000	27	4.5		√	√	√
180st_m27010	53	1000	27	2.9		√	√	√
180st_m27015	54	1500	27	4.3		√	√	√
180st_m35010	55	1000	35	3.7		√	√	√
180st_m35015	56	1500	35	5.5		√	√	√

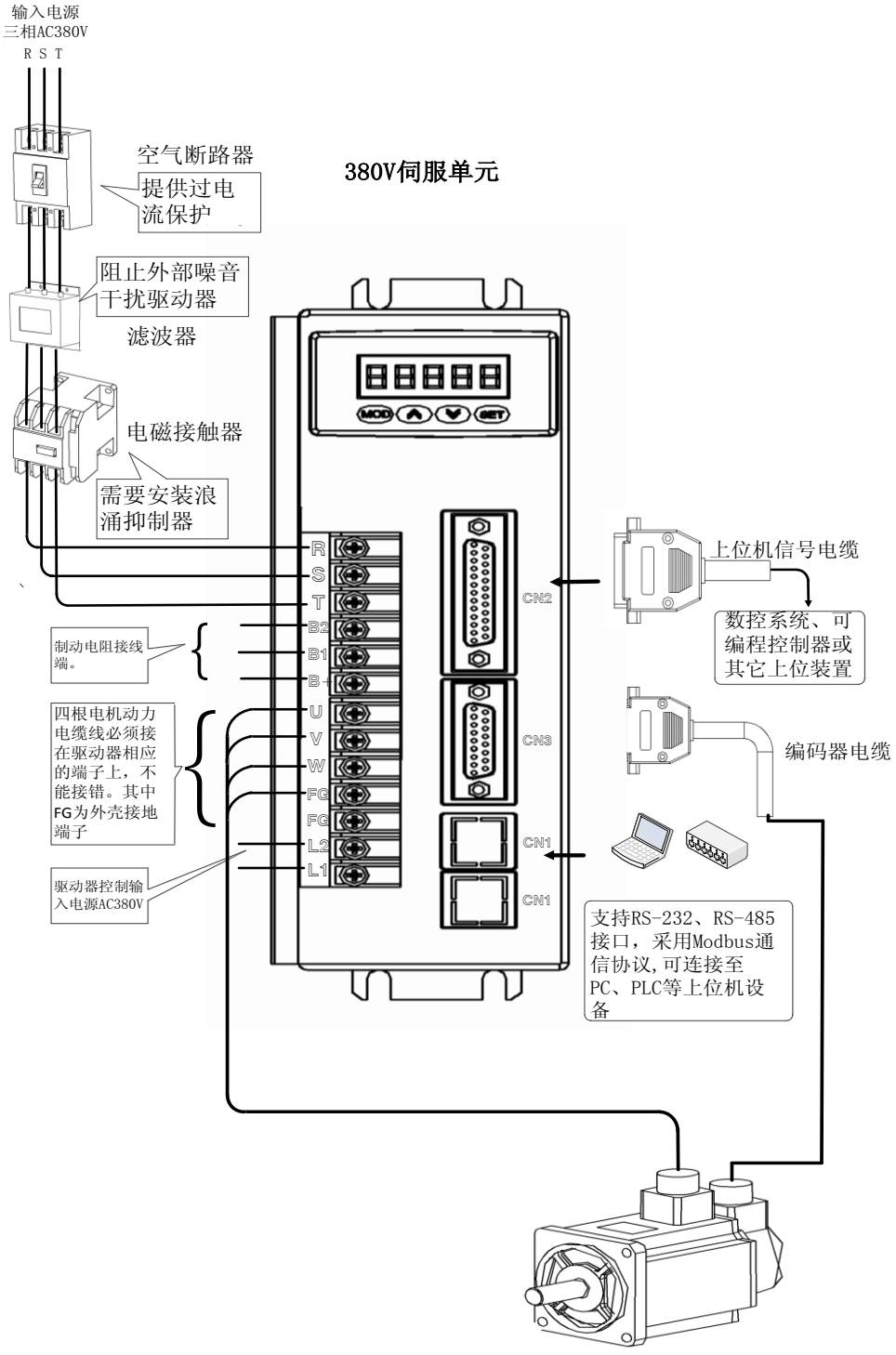
The second chapter wiring

2.1 System composition and connection

2.1.1 220V servo drive wiring diagram



2.1.2 380V servo drive wiring diagram



2.1.3 Wiring instructions

Wiring notes:

- Wiring materials are used in accordance with wire specifications.
- Cable length, instruction cable 3M, less than 20m of encoder cable.
- The 220V drive power L1, L2, L3 power supply wiring is correct, please do not connect to the 380V power supply.
- The 380V drive power R, S, T power supply wiring is correct, please do not connect to the 220V power supply, otherwise the motor is not functioning properly.Control power L1, L2 must be normal access, otherwise the drive can not start running.
- Motor output U, V, W terminals phase sequence, and the corresponding terminals must correspond to the motor. If the connection is wrong, the motor may not turn or drive, damaging the drive. The motor can not be reversed by replacing the three-phase terminal, which is quite different from the asynchronous motor.
- must be reliable grounded and single point grounding.
- The relay that is mounted on the output signal must be connected correctly in the direction of the diode it is used for, otherwise it will cause a fault and cannot output the signal.
- in order to prevent the error caused by noise, please add the insulation transformer and noise filter on the power supply in the same wiring tube.
- Please install non fusing circuit breaker so that the driver can cut off the external power supply in time.

2.1.4 Wire specification

Connection terminal	Symbol	Wire specification
Power cord	U、V、W	0.75～2.5㎜²
Motor connecting terminal		0.75～2.5㎜²
Ground terminal		0.75～2.5㎜²

Control signal terminal	C N 2	⩾**0.12** ㎜² (AWG26), Shielded wire
Encoder signal terminal	C N 3	⩾**0.12** ㎜² (AWG26), Shielded wire

The encoder cable must be twisted pair. If the encoder cable is too long (>20m), the encoder will have insufficient power supply, and the power and ground can be connected by multiple wires or using a thick wire.

2.1.5 Strong terminal description

●220V drive terminals

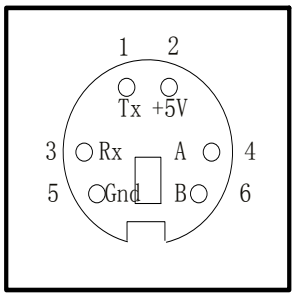
Name	Terminal symbol	Detailed description
Main circuit power supply	L1、L2、L3	Connect external AC power, three-phase 220VAC -15% to +10% 50/60Hz The single-phase power supply shall be connected to the L1 and L2 terminals
Motor connecting terminal	U	Output to the motor U phase power supply
	V	Output to the motor V phase power supply
	W	Output to the motor W phase power supply
Ground terminal		Motor housing earthing terminal
		Driver ground terminal

● 380V drive terminals

Name	Terminal symbol	Detailed description
Control circuit power supply	L1、L2	Connect an external AC power supply Three-phase 380VAC -15% to +10% 50/60Hz
Braking resistor terminal	B1、B2、B+	If internal braking resistor is used, short B2, B1 shall be used. If an external braking resistor is used, the connections between the B2 and B1 terminals must be removed, and the brake resistance shall be mounted on the B2 and B+ terminals.
Motor connecting terminal	U	Output to the motor U phase power supply
	V	Output to the motor V phase power supply
	W	Output to the motor W phase power supply
Ground terminal	FG	Motor housing earthing terminal
	FG	Driver ground terminal

2.2 CN1 communication interface

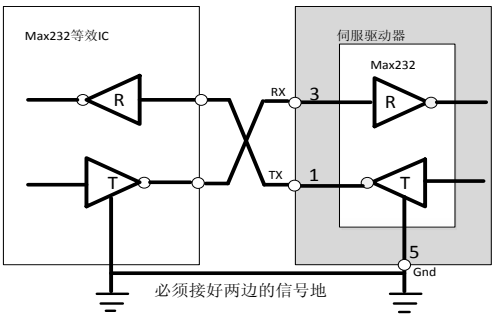
2.2.1 CN1 port signal definition



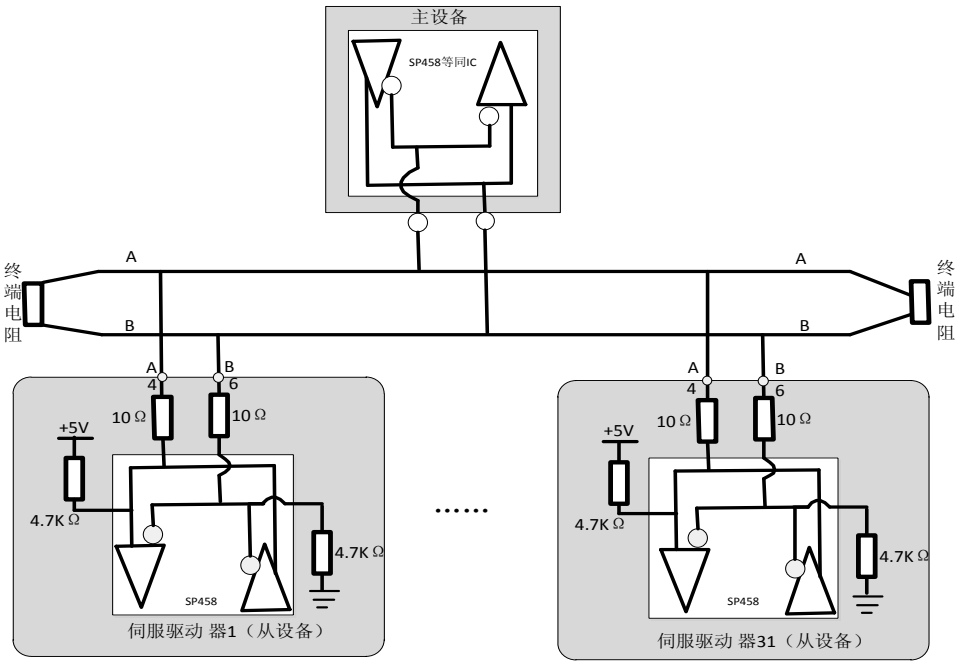
Name	Pin number	function
+5V	2	5V
GND	5	ground
Tx	1	RS-232 Sending end
Rx	3	RS-232 receiving end
A	4	RS-485 A
B	6	RS-485 B

2.2.3 CN1 port type

1. RS-232 interface



2. RS-485 interface



●When using RS485 communication, at most 31 servo drivers can be connected at the same time, and 485 terminals of the network need to be connected with a terminal resistor of 120 ohm respectively. To connect more devices must be used to expand the number of connected repeaters.

2.3 CN2 control interface

The CN2 control signal terminal provides the signal needed for the connection with the upper controller, and uses the DB25 DB44 socket:

●4 programmable inputs (Standard Version), 10 programmable inputs (advanced version);

●4 programmable outputs (Standard Version), 5 programmable outputs (Advanced Edition);

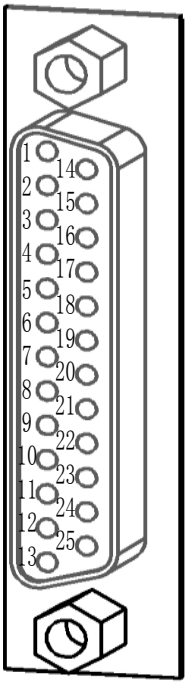
●Analog command input;

●Pulse command input;

●Encoder signal input;

●Encoder frequency division output signal;

2.3.1 CN2 port signal definition



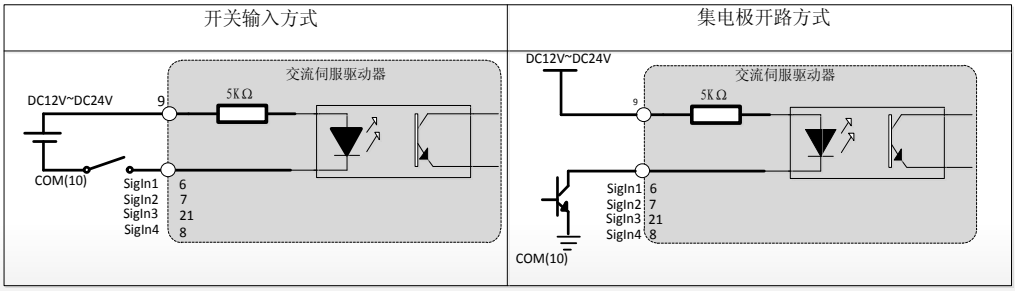
Pin	Interface number	Name	function
DC12~24V COM	9 10	The power and ground of the control signal	The input and output control signals are input power and ground
SigIn1 SigIn2 SigIn3 SigIn4	6 7 21 8	Input instruction signal	Input instruction signal. The function specified by each input port at the factory: SigIn1: Servo enable SigIn2: Alarm reset SigIn3: Clearance of position deviation SigIn4: Pulse input inhibit
SigOUT1 SigOUT2 SigOUT3 SigOUT4	11 23 12 24	Output instruction signal	Output instruction signal. The function specified by each output signal port at the factory: SigOUT1： Servo enable SigOUT2： Alarm detection SigOUT3： Location complete SigOUT4： Emergency stop detection
PV PP+ PP- PD+ PD-	2 3 14 4 5	Command pulse input port	PV: open collector input power The instruction pulse can be input in three different ways: 1： Command direction and pulse input 2： Clockwise / anticlockwise pulse input 3：Quadrature pulse input with phase difference of 90 degrees
PA+ PA- PB+	20 19 18	Encoder signal output	The output port of the encoder signal (ABZ). Through the parameter setting, the AB signal can be divided into

	PB- PZ+ PZ- OZ GND	17 15 16 22 1		frequency division output and logic fetch reverse output.
	Vref AGND	25 13	Analog input	Analog voltage input port. Speed or torque control used to receive speed or torque instructions. Voltage input range -10V~+10V.

2.2.3 CN2 port type

1. Digital input interface

The digital input interface circuit can be controlled by switch, relay, collector, open circuit triode, photoelectric coupler, etc.. The relay needs to select low current relay to avoid the bad contact. External voltage range DC12V to 24V.



2. Digital output interface

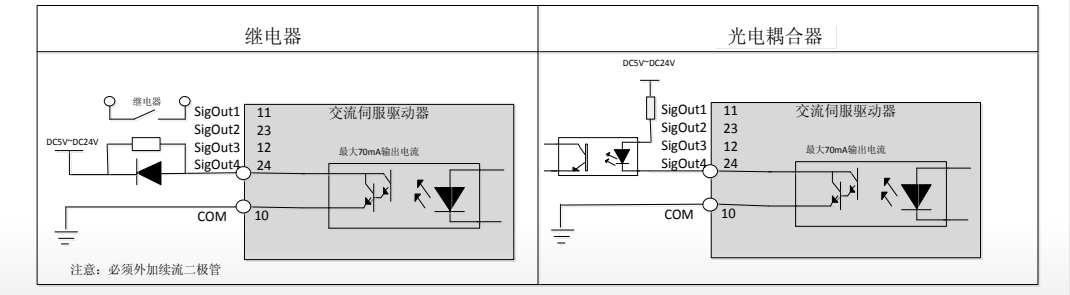
The output circuit adopts Darlington photoelectric coupler, and can be connected with relay and photoelectric coupler.

Matters needing attention：

●The external power supply is provided by the user, but it must be noted that if the polarity of the power is reversed, the servo drive may be damaged.

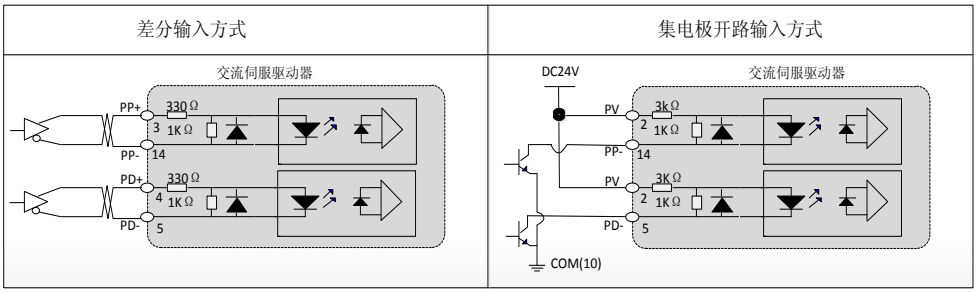
●The output is in the form of an open collector, the maximum current is 70mA, and the maximum voltage of the external power supply is 25V. If the limit request or output is connected directly to the power source, the servo drive may be damaged.

●If the load is an inductive load such as a relay, the freewheeling diode must be connected in parallel at both ends of the load. If the freewheeling diode is turned on, the servo drive may be damaged.



3. Position pulse instruction interface

There are two ways to drive differential drive and one end drive. Differential drive connection is recommended. Twisted pair should be used for wiring.

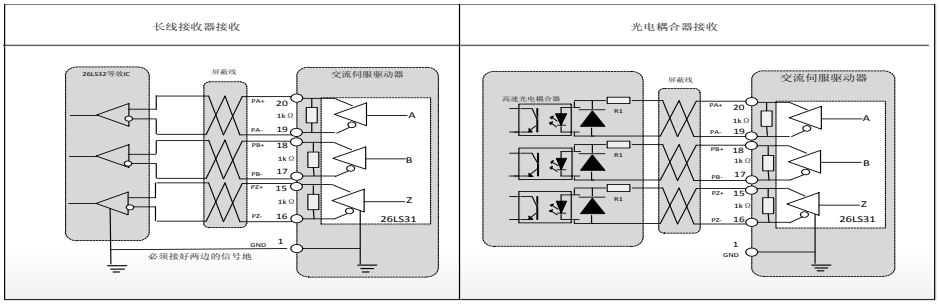


●In the differential input mode, the proposed use of AM26LS31 similar line driving chip; in order to make the pulse data transmission have very good anti-interference ability, recommend the use of differential drive mode; the maximum input pulse frequency 550kHz (kpps).

●Under the open collector input mode, the maximum input pulse frequency is 200kHz (kpps).

4. Encoder signal differential drive output

After the encoder signal is divided into frequency, it is output to the upper controller through line driver (26LS31).

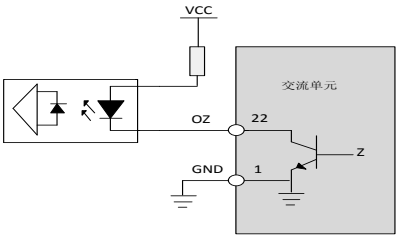


●When the long line receiver is received, the driver encoder signal (GND) must be connected to the upper controller signal.

●When the optocoupler is received, the upper controller uses a high-speed optocoupler (for example, 6N137), and the current limiting resistor R1 has a value of about 220.

5. Encoder ABZ signal open collector output

The servo drives the ABZ signal of the encoder in an open collector mode. Since the Z pulse width is narrow, the upper computer should be received by high-speed optocoupler.

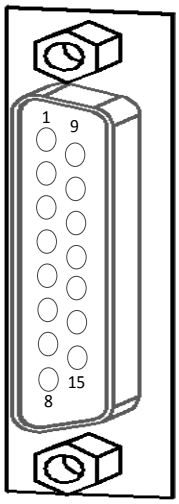


● VCC maximum voltage 30V, output current maximum 50mA.

●Only the advanced servo unit supports the open collector output function of the A and B signals.

2.4 CN3 encoder interface

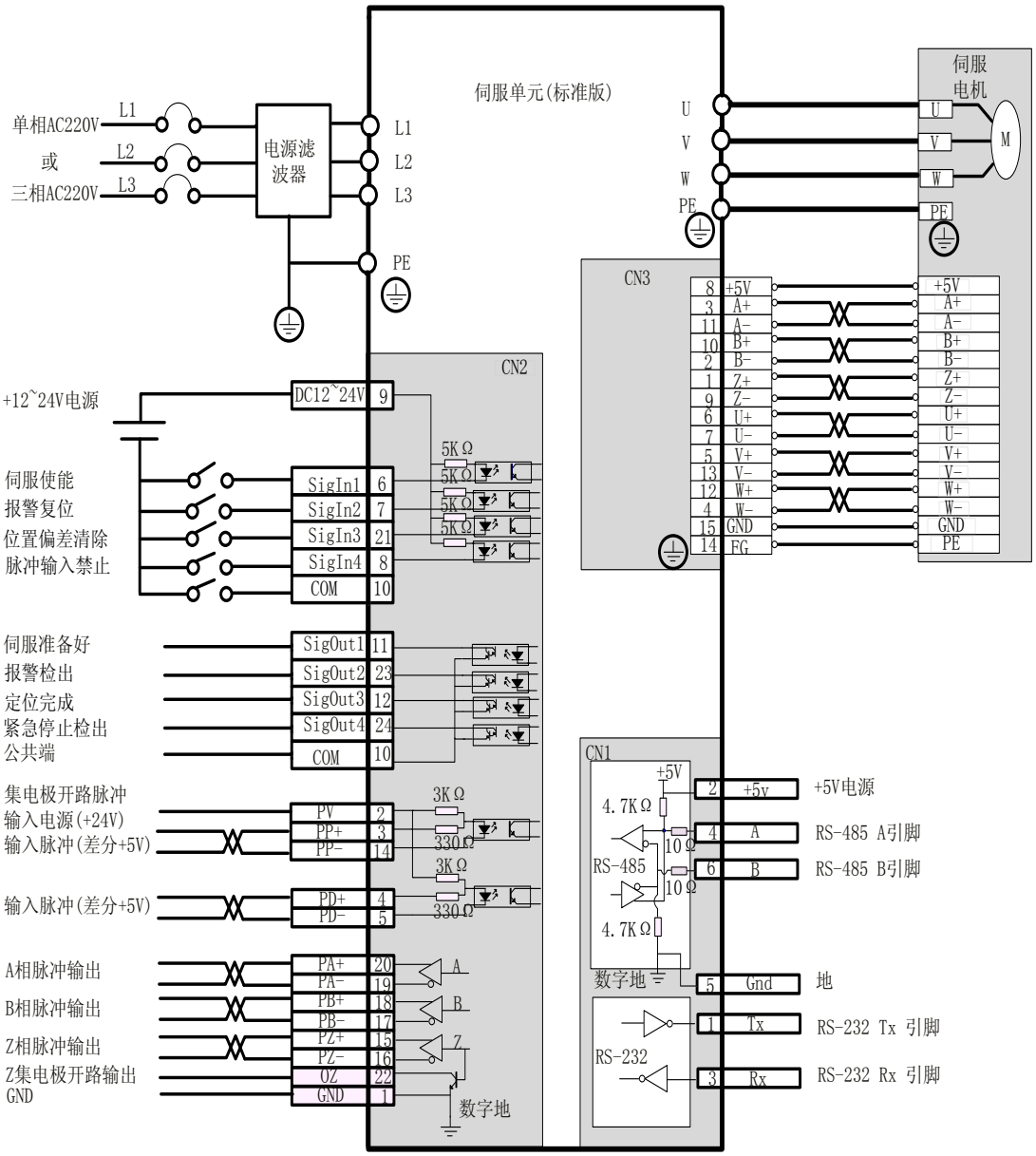
2.4.1 CN3 encoder signal definition



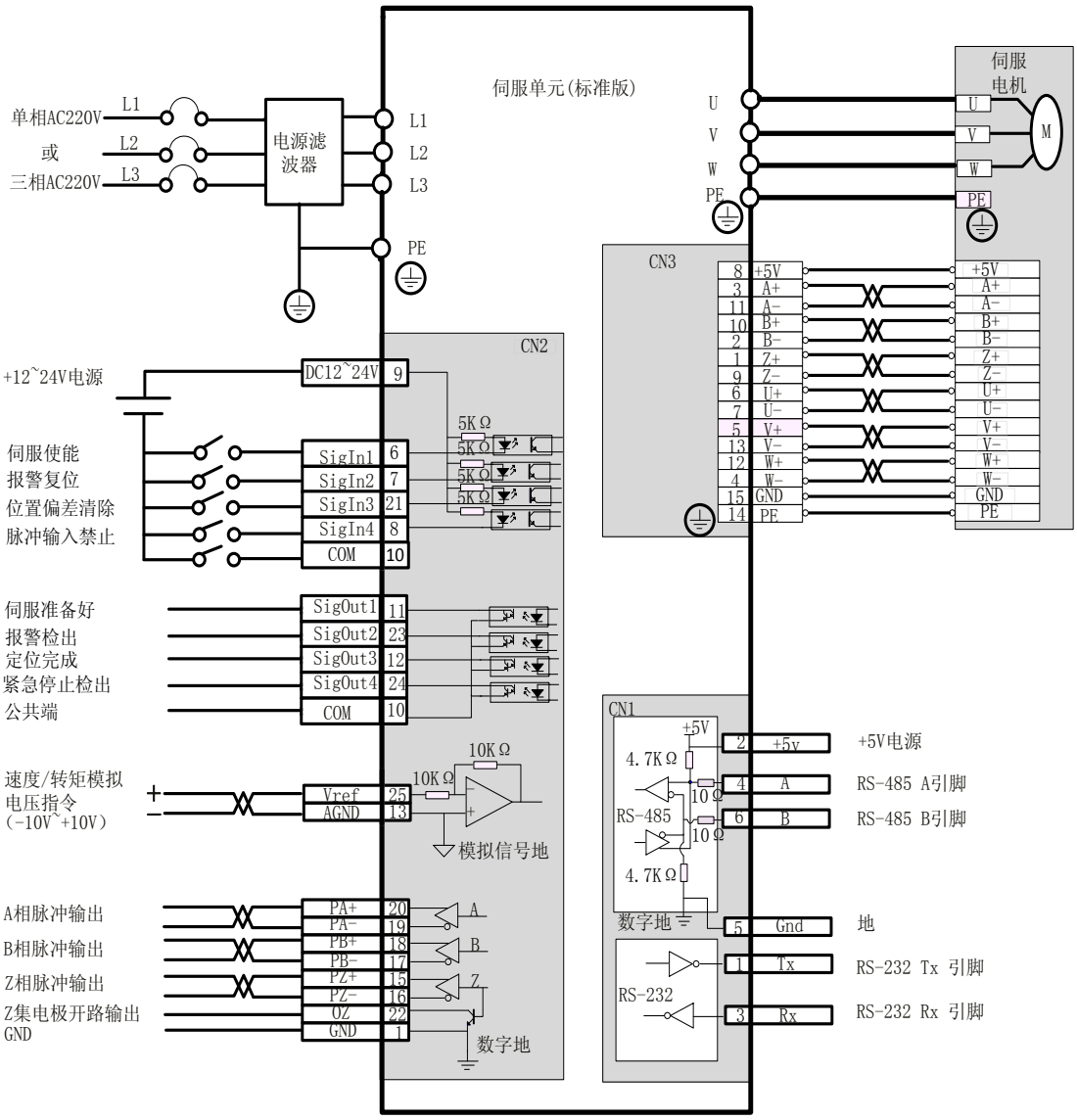
Encoder	Pin number	Name
Incremental encoder	8	+5v
	15	GND
	3	A+
	11	A-
	10	B+
	2	B-
	1	Z+
	9	Z-
	6	U+
	7	U-
	5	V+
	13	V-
	12	W+
	4	W-
	14	PE
Absolute encoder	4	SD+
	3	SD-
	14	FG
	15	GND

2.3 Standard connection

2.3.1 Position control wiring diagram



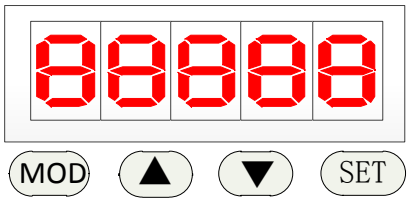
2.3.3 Speed / torque control wiring diagram



The third chapter shows and operates

3.1 Panel composition

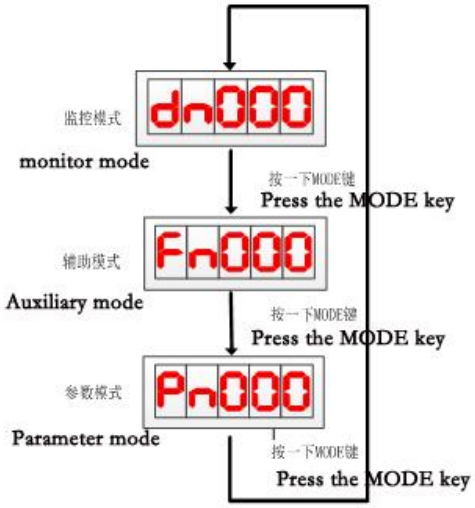
3.1.1 Display and button



Key	Key name	Function
MODE	Mode select key	1 Mode switching 2 Return to higher directory
▲	Digital add key	Add numbers, Long press with repeat effect
▼	Digital reduction key	Digital reduction, Long press with repeat effect
SET	Shift key	1 Digital shift 2 Set the setting (press for 1 seconds) 3 End the parameter setting (press for 1 seconds l)

Note: if the 5 decimal points of the display screen are all flashing, the alarm will be generated by the alarm. After the alarm has to be cleared, the drive will work properly.

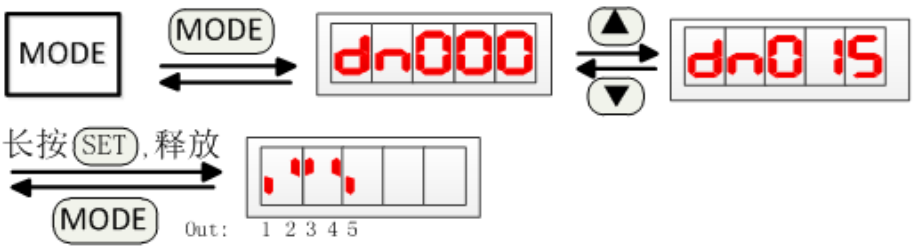
3.2 Mode switching



Description: when the screen shows Fnxxx, Dnxxx, Pnxxx, at this time in the top directory, mode key for mode switching function, can be switched directly to other mode, otherwise, mode key to return to the upper directory function.

3.3 Monitoring mode (Dn) operation

Example: check dn015 monitoring parameters, at this time, sigOut1 and sigOut5 port is low, sigOut2, sigOut3, sigOut4 port is high.



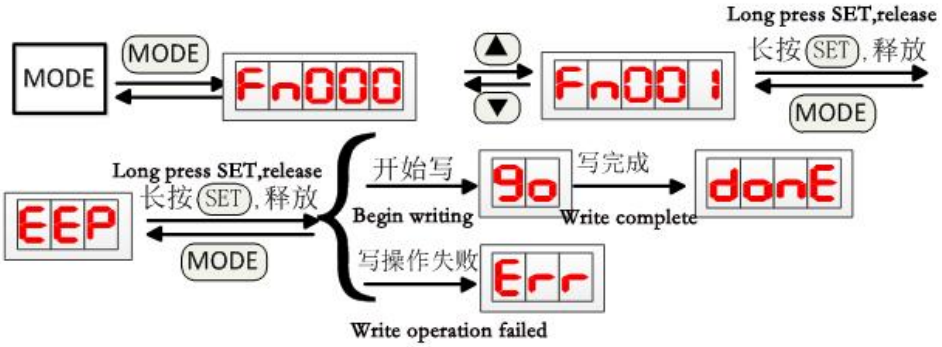
3.4 Auxiliary mode (Fn) operation

●Auxiliary function list

NO.	Description
Fn000	Alarm record query
Fn001	User parameters are permanently written. If the user sets the parameters in the Pn000~Pn280, the driver must load the user's modified parameters for the next time they are powered on. The parameter is written to the internal EEPROM chip. After performing the operation, it takes about 5 seconds to write all the parameters into the EEPROM.
Fn002	JOG commissioning operation
Fn003	Clear the currently detected alarms
Fn004	Returns the default factory value of the Pn000~Pn280 parameter in the parameter list, based on the Pn000 settings.
Fn005	Clear position deviation
Fn006	The SigOut port forces output, and the force state is valid only for this operation. 0： SigOut all ports cancel mandatory status. 1： SigOut all ports forced output high level. 2： SigOut all ports forced output low.
Fn007	Analog torque command voltage correction
Fn008	Analog speed command voltage correction
Fn009	busbar voltage crrection
Fn010	Temperature correction
Fn011	Alarm record initialization
Fn012	Encoder zeroing
Fn015	Absolute encoder, multi circle data, zeroing
Fn016	Absolute encoder, alarm reset
Fn018	Load inertia estimation

3.4.1.1 Fn000 alarm function inquiry

3.4.1.2 Fn001 user parameters are permanently written

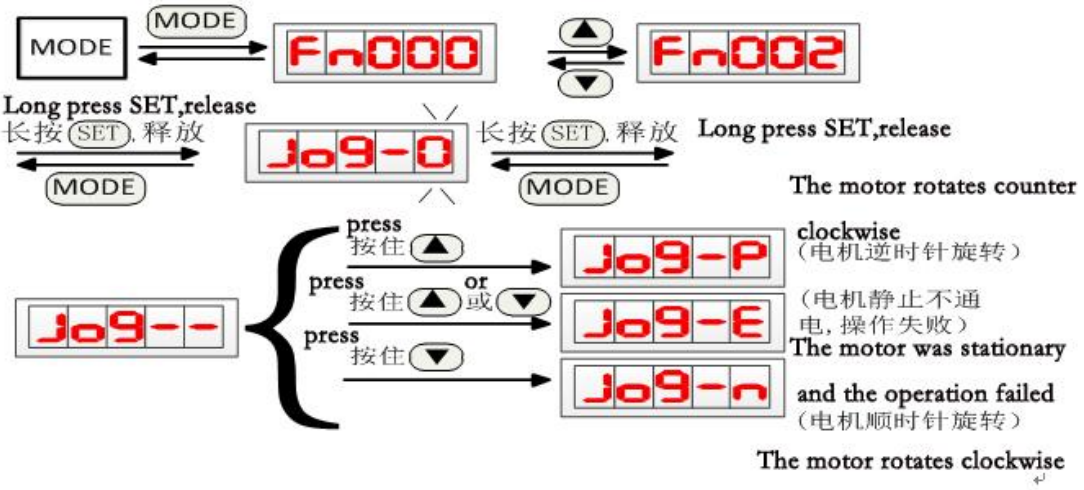


Note 1: if the last operation shows  that it may be a write data operation within the drive, please wait a few seconds to try again.

Note 2: you must wait for writing to complete the power failure, otherwise, after rebooting, may cause storage chip content damage (AL-01 alarm).

3.4.1.3 Fn002 commissioning operation

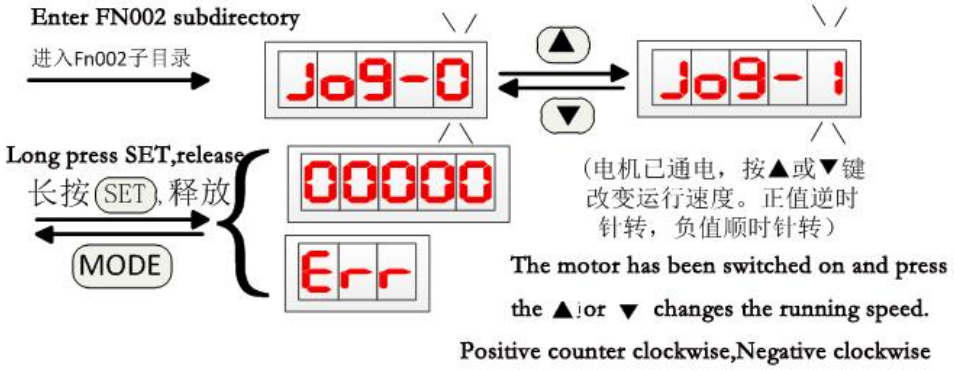
0： Inching mode



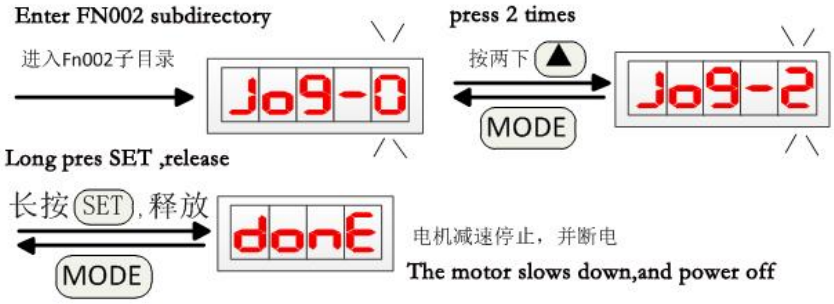
Jog running speed and acceleration and deceleration time can be set by the following parameters:

Pn177	JOG speed	0~5000	200	r/min
Pn178	JOG Acceleration time	5~ 10000	100	ms
Pn179	JOG Deceleration time	5~ 10000	100	ms

1：Speed regulation mode



2: Exit speed regulation mode



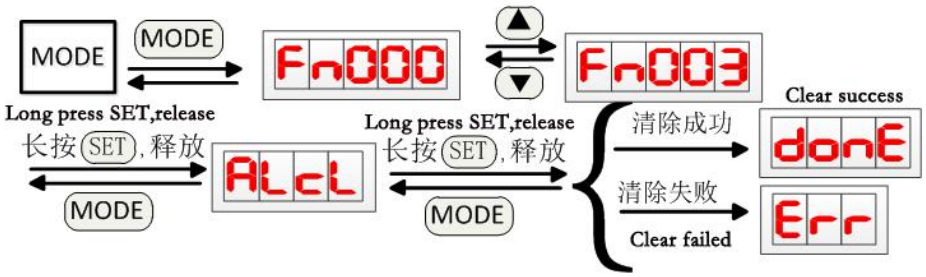
Operation mode	Description
0	Inching model. Press ▲ or ▼key motor will rotate clockwise or counterclockwise; release ▲ or ▼key, the motor will stop rotating in the energized state.
1	Enter the speed control mode, the motor power work. Driver in speed loop mode, running speed by the key input ▲ or ▼. During the operation of the motor, other menu operations can be carried out. If the motor is stopped rotating, enter the Jog_2 mode.
2	Exit the speed regulation mode and the motor is out of power.

Explanation: if the operation is displayed Jo9-E or Err possible reasons for:

1: the motor is in the enabling or rotating state. The motor must be in a non working state prior to the JOG commissioning operation. During commissioning, the servo driver control interface does not receive any control lines.

2: servo drive alarm occurred, and the alarm is not cleared.

3.4.1.4 Fn003 alarm cleanup operation

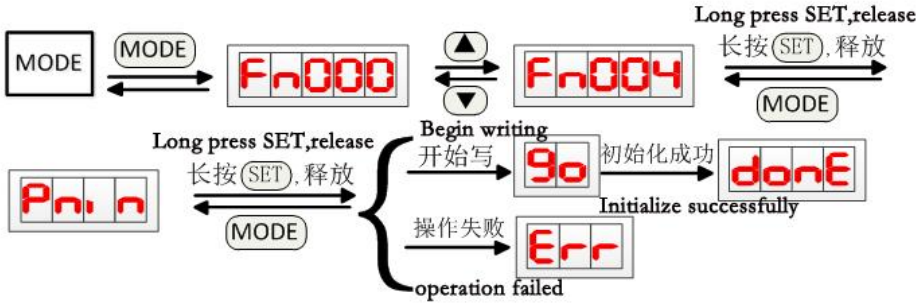


说明：

Explanation: when the final cleanup fails,shows  ,the detected alarm is cleared only after power on.

An alarm that can be cleared by clearing operations		The alarm can be cleared before power on	
AL--02	low voltage	AL--01	Memory exception
AL--05	1 Overload 1	AL--03	Overvoltage
AL--07	Motor speed is too high	AL--04	Intelligent power module exception
AL--08	Radiator overheating	AL--06	2 Overload 2
AL--10	Too high pulse frequency	AL--09	Encoder exception
AL--11	The position pulse deviation is too large	AL--13	CPU internal fault
AL--12	The current sampling loop may be damaged	AL--17	Encoder signal frequency division output abnormal setting
AL--14	Emergency shutdown	AL--18	电机代码设置不当 Improper motor code setting
AL--15	Drive forbidden exception	AL--20	Function port repeat settings
AL--16	Brake mean power overload	AL--21	Memory contents are completely destroyed
AL--19	Power module overheating	AL--22	Watchdog timer overflow
		AL--31~ AL--43	Absolute encoder related alarm

3.4.1.5 Fn004 parameter initialization operation



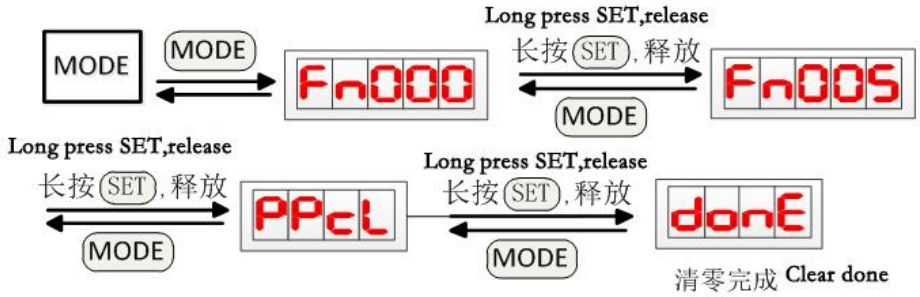
Note 1: if the last operation is displayed  , the possible cause of it is shown:

1: the driver is performing write operations.

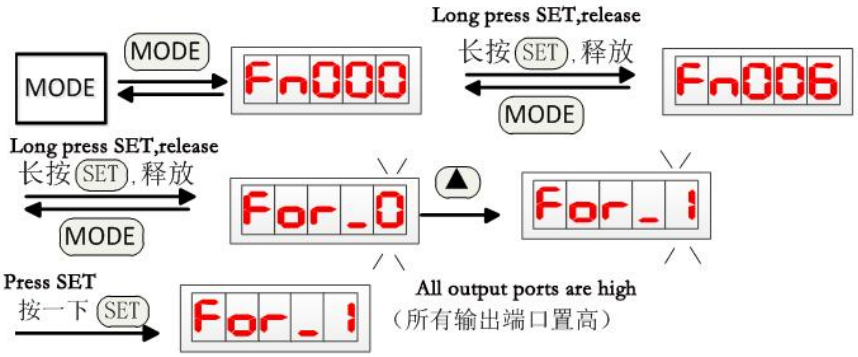
2: parameter Pn000 has no open parameter initialization function.

Note 2: you must wait for writing to complete the power failure, otherwise, after rebooting, may cause storage chip content damage (AL-01 alarm).

3.4.1.6 Fn005 position offset reset operation

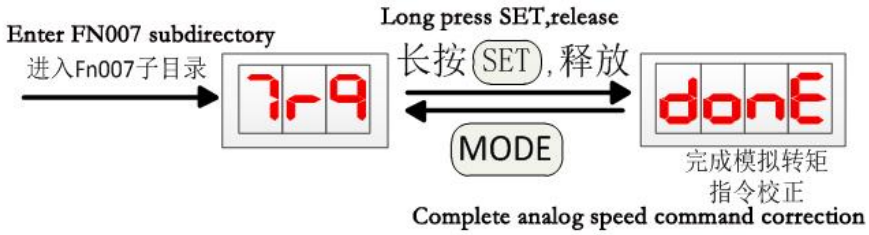


3.4.1.7 Fn006 port forced output



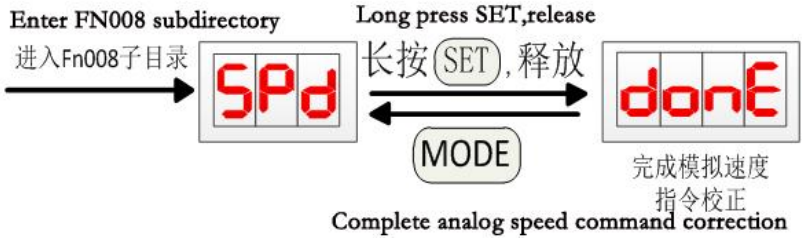
Parameter selection	Description
0	Cancel mandatory status
1	All SigOut ports are forced high
2	All SigOut ports are forced low

3.4.1.8 Fn007 analog torque command voltage correction



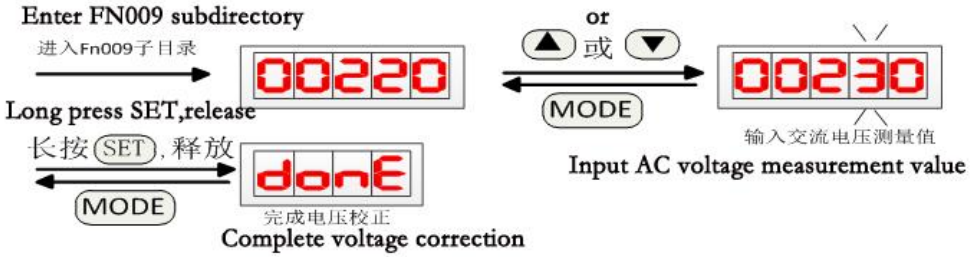
Note 1: before the calibration operation, the analog voltage input port Vref (25 pin) of the CN2 is connected to the reference zero voltage.

3.4.1.9 Fn008 analog speed command voltage correction



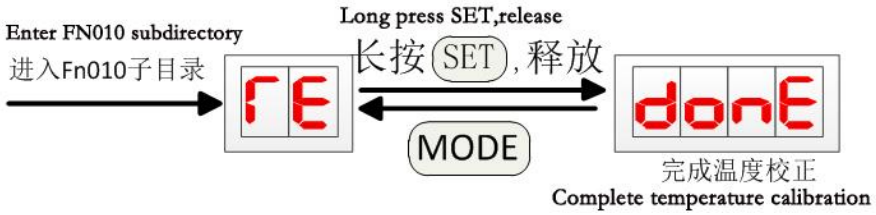
Note 1: before the calibration operation, the analog voltage input port Vref (25 pin) of the CN2 is connected to the reference zero voltage.

3.4.1.10 Fn009 bus voltage correction

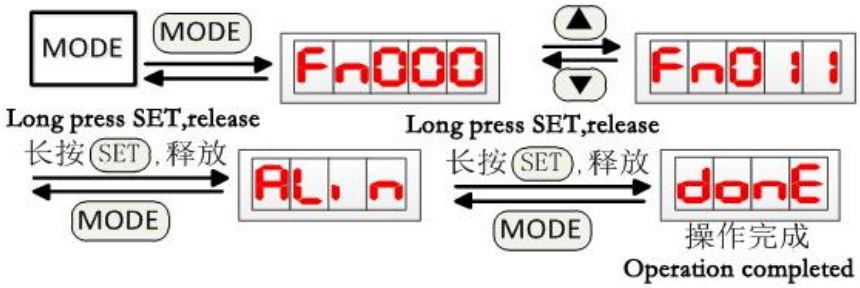


Note 1: when correcting, the control power supply and the power supply must be connected and the AC voltage inputted by the driver is measured and input into the operation.

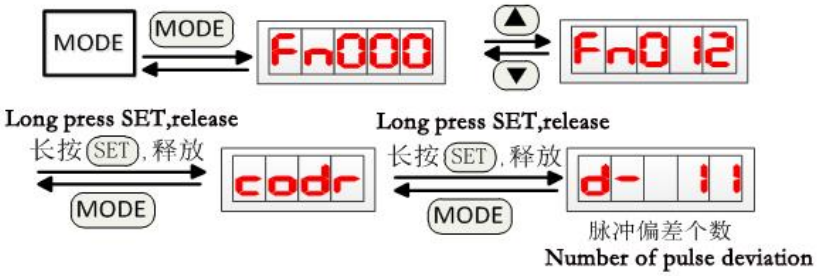
3.4.1.11 Fn010 temperature correction



3.4.1.12 Fn011 alarm record initialization operation



3.4.1.13 Fn012 encoder zeroing

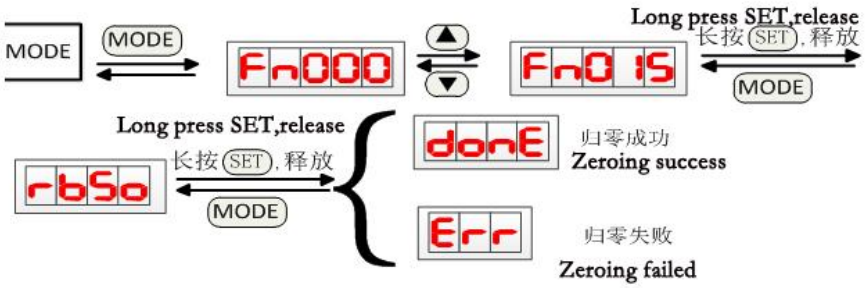


Before setting the zero operation, confirm the motor code Pn001 setting value is consistent with the actual motor model, otherwise it may cause the motor current is too large, damage the motor. Zero time, no internal enable or external enable motor, the motor will be several laps, and then lock the zero position. When the number of pulses displayed is less than 10, the motor is aligned to zero.

Note 1: if the motor is very hot, it must cool down for a period of time.

Note 2: absolute encoder, after the zero adjustment is completed, have to wait a few seconds to complete the data written to power off.

3.4.1.14 Fn015 absolute encoder multi turn data zeroing

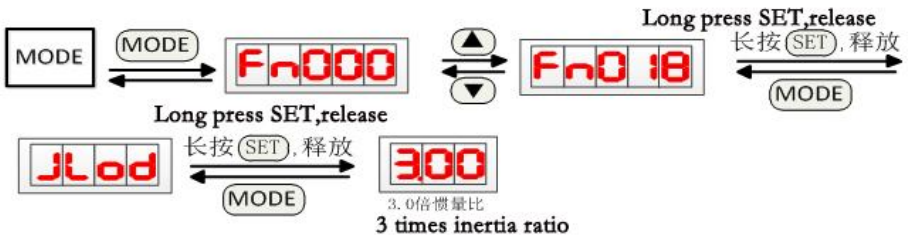


If zero success, multi ring data will be set to 0, while all the latch encoder alarm is reset; on the other hand, may be due to the encoder communication fault alarm or the motor is enabled to multi circle data zero operation.

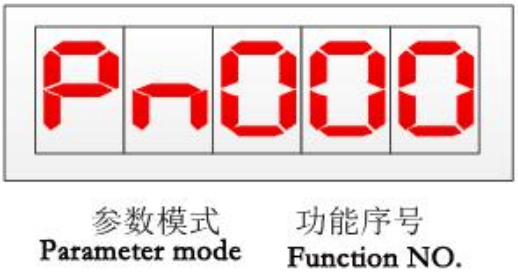
3.4.1.15 Fn016 absolute encoder alarm reset

If the encoder alarm reset is successful, all latch encoder alarms are reset; otherwise, there may be a communications malfunction alarm or a motor in the enable state, resulting in no reset operation.

3.4.1.16 Fn018 load inertia estimation

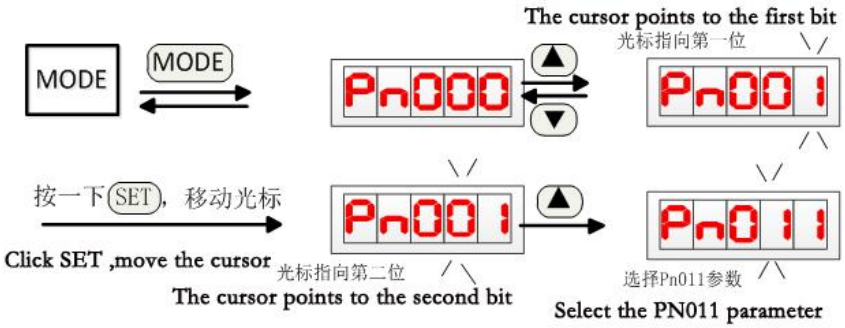


3.5 User parameter mode (Pn) operation



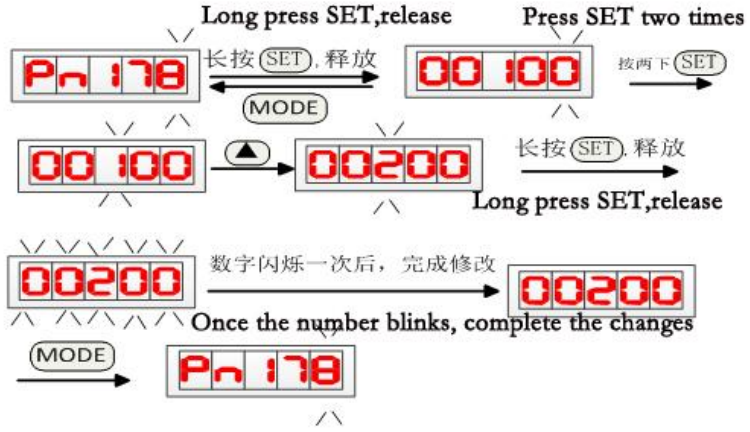
●Select parameter number

Example: select the Pn011 parameter.



●Parameter editing

Example: the current value of the Pn178 parameter is changed from 100 to 200, and the following is the specific operation:



Note: after editing the parameter, please wait for 5 seconds to power off.

The fourth chapter, Pn function parameter

4.1 Parameter settings panel action

See the “user parameter mode operation” in chapter third

4.2 Parameter list

- The number of column, if there is a symbol ▲, parameter setting, to be re energized to take effect; if there is a sign ◆that said, parameter setting, re enable the motor parameters to take effect; if there is no special symbols, immediately effect.
- In the model column, "All" is indicated for torque, speed, position control, T, for torque control, S for speed control, and P for position control.
- Parameters must be carefully set. Improper setting may cause motor to run unstable.

4.2.1 System control parameter

NO.	Name	Range of values	Default value	Unit	apply
Pn000	Parameter editing and initialization	0~3	1	-	All
Pn001▲	Motor code	0~70	7	-	All
Pn002▲	control mode	0~5	2	-	All
Pn003	Servo enable mode	0~1	0	-	All
Pn004	Servo disconnect enable shutdown mode	0~2	0	-	All
Pn005	Breaking enable deceleration time	5~10000	100	ms	All
Pn006	Use / do not use positive and negative drive prohibited	0~3	0	-	All
Pn007	Positive / reverse drive, no stopping, deceleration time	0~10000	60	ms	All
Pn008	Internal forward torque limit (CCW)	0~300	300	%	All
Pn009	Internal reverse torque limit (CW)	-300~0	-300	%	All
Pn010	External forward torque limit (CCW)	0~300	300	%	All
Pn011	External reverse torque limit (CW)	-300~0	-300	%	All
Pn012	Forward (CCW) torque overload 1	0~300	200	%	All

	alarm level				
Pn013	Reverse (CW) torque overload 1 alarm level	-300~0	-200	%	All
Pn014	Torque overload 1 alarm detection time	1~900	250	100ms	All
Pn015	Overload 2 detection time	1~300	80	100ms	All
Pn016▲	DA Molecular DA for frequency division output of an incremental encoder	1~127	1	-	All
Pn017▲	The denominator of frequency division output of incremental encoder DB	1~127	1	-	All
Pn018▲	Encoder output pulse AB phase logic inversion	0~1	0	-	All
Pn019▲	Rated current setting	0.0~100.0	0	Arms	All
Pn020▲	Rated speed setting	0~5000	0	r/min	All
Pn021	Reach a predetermined speed	0~5000	500	r/min	All
Pn022	Arrive at a predetermined speed, lag, compare difference	0~5000	30	r/min	All
Pn023	Arrive at a predetermined speed, direction of detection	0~2	0	-	All
Pn024	Arrival torque	0~300	100	%	All
Pn025	Lag difference between arrival torque and preset torque	0~300	5	%	All
Pn026	Reach the desired torque direction	0~2	0	-	All
Pn027	Zero speed detection amplitude setting	0~1000	10	r/min	All
Pn028	Zero speed test return error	0~1000	5	r/min	All
Pn029	Zero speed detection point of motor electromagnetic brake	0~1000	5	r/min	All
Pn030	Delay time of electromagnetic brake when the motor is stationary	0~2000	0	ms	All
Pn031	When the motor is running, the electromagnetic brake wait time	0~2000	500	ms	All
Pn032	The speed of the electromagnetic	0~3000	30	r/min	All

	brake when the motor is running				
Pn033	Origin regression trigger mode	0~3	0	-	All
Pn034	Origin regression reference point mode	0~6	0	-	All
Pn035	Origin regression origin mode	0~2	0	-	All
Pn036	Origin position offset high	-9999~9999	0	万个	All
Pn037	Origin position offset low	-9999~9999	0	个	All
Pn038	Origin regression first speed	1~3000	200	r/min	All
Pn039	Origin regression second speed	1~3000	50	r/min	All
Pn040	Origin regression acceleration time	5~10000	50	ms	All
Pn041	Origin regression deceleration time	5~10000	50	ms	All
Pn042	Origin on time delay	0~3000	100	ms	All
Pn043	The origin regression completes the signal delay	5~3000	80	ms	All
Pn044	Origin return instruction execution mode	0~1	0	-	All
Pn045	Gain switching selection	0~5	0	-	All
Pn046	Gain switching level	0~30000	80	-	All
Pn047	Gain switching back difference	0~30000	6	-	All
Pn048	Gain switching delay time	0~20000	20	0.1ms	All
Pn049◆	Gain switching time 1	0~15000	0	0.1ms	All
Pn050◆	Gain switching time 2	0~15000	50	0.1ms	All
Pn051	Maximum speed limit for motor operation	0~5000	3000	-	All
Pn052▲	SigIn1 port function allocation	-31~31	1	-	All
Pn053▲	SigIn2 port function allocation	-31~31	2	-	All
Pn054▲	SigIn3 port function allocation	-31~31	19	-	All
Pn055▲	SigIn4 port function allocation	-31~31	20	-	All
Pn056	SigIn1 port filtering time	1~1000	2	ms	All
Pn057	SigIn2 port filtering time	1~1000	2	ms	All
Pn058	SigIn3 port filtering time	1~1000	2	ms	All
Pn059	SigIn4 port filtering time	1~1000	2	ms	All
Pn060▲	SigOut1 port function allocation	-14~14	2	-	All
Pn061▲	SigOut2 port function allocation	-14~14	1	-	All

Pn062▲	SigOut3 port function allocation	-14~14	4	-	All
Pn063▲	SigOut4 port function allocation	-14~14	3	-	All
Pn064▲	communication mode	0~2	2	-	All
Pn065	Communication station	1~254	1	-	All
Pn066▲	Communication baud rate	0~5	5	-	All
Pn067▲	Communication mode setting	0~8	8	-	All
Pn068	The input function control mode selects the register 1	0~32767	0	-	All
Pn069	The input function control mode selects the register 2	0~32767	0	-	All
Pn070	Input function logic status setting register 1	0~32767	32691	-	All
Pn071	Input function logic status setting register 2	0~32767	32767	-	All
Pn072	Input function logic status setting register 3	0~1	0	-	All
Pn073	Input function logic status setting register 3	0~1	1	-	All
Pn074	Fan opening temperature	30~70	50	Centigrade	All
Pn075	Fan operation mode	0~2	0	-	All
Pn076	Emergency shutdown (EMG) reset mode	0~1	0	-	All
Pn077	Positive / reverse drive forbidden detection	0~2	0	-	All
Pn078	Undervoltage detection	0~1	1	-	All
Pn079	System status display project selection	0~30	0	-	All
Pn080▲	Incremental encoder line number	0~16000	0	line	All
Pn081	User parameter permanent write operation	0~1	0	-	All
Pn082	SigOut port forced output	0~4095	0	-	All
Pn083	Low voltage alarm detection amplitude	50~280	200	V	All
Pn084	High temperature alarm detection amplitude	0~100	70	Centigrade	All

Pn085▲	Pole count of motor	0~100	0	对	All
Pn086	Internal use	-	-	-	-
Pn087▲	Selection of braking resistance	0~2	1	-	All
Pn088	Brake resistor regeneration overload alarm level	50~250	90	%	All
Pn089▲	External braking resistance power	20~20000	100	W	All
Pn090▲	External braking resistance value	10~1000	100	Ω	All
Pn091	External brake resistance, regeneration, available capacity	5~100	20	%	All
Pn092	Overload detection of braking resistor	0~1	1	-	All
Pn093~Pn095	Internal use	-	-	-	-

4.2.2 Position control parameter

NO.	Name	Range of values	Default value	Unit	apply
Pn096▲	Command pulse input mode	0~2	0	-	P
Pn097▲	Instruction pulse input direction logic selection	0~1	0	-	P
Pn098	Pulse electron gear ratio of molecule 1	1~32767	1	-	P
Pn099	Pulse electron gear ratio of molecule 2	1~32767	1	-	P
Pn100	Pulse electron gear ratio of molecule 3	1~32767	1	-	P
Pn101	Pulse electron gear ratio of molecule 4	1~32767	1	-	P
Pn102▲	The denominator of a pulsed electronic gear ratio	1~32767	1	-	P
Pn103	The position deviation is out of range setting	1~ 2000	500	ten thousand	P

Pn104	Location setting	0~ 32767	10	个	P
Pn105	Position setting complete backlash setting	0~ 32767	3	个	P
Pn106	Location approach range setting	0~ 32767	300	个	P
Pn107	Location approach back difference setting	0~ 32767	30	个	P
Pn108	Position deviation clearing mode	0~1	1	-	P
Pn109◆	Position command acceleration and deceleration mode	0~2	0	-	P
Pn110◆	Position instruction, primary filtering, time constant	5~500	50	ms	P
Pn111◆	Ta Position instruction, S shape filtering, time constant Ta	5~340	50	ms	P
Pn112◆	Ts Position instruction, S shape filtering, time constant Ts	5~150	20	ms	P
Pn113	Position loop feedforward gain	0~100	0	%	P
Pn114▲	Position loop, feedforward filter, time constant	1~50	5	ms	P
Pn115	Position regulator gain 1	1~2000	100	1/S	P
Pn116	Position regulator gain 2	1~2000	100	1/S	P
Pn117	Location command source selection	0~3	0	-	P
Pn118	Internal position instruction pause mode selection	0~1	0	-	P
Pn119	Internal position suspension deceleration time	0~10000	50	ms	P
Pn120	Internal position command 0 pulse number high setting	-9999~9999	0	万个	P
Pn121	Internal position command 0 pulse number low setting	-9999~9999	0	个	P
Pn122	Internal position command 1 pulse number high setting	-9999~9999	0	万个	P
Pn123	Internal position command 1 pulse number low setting	-9999~9999	0	个	P
Pn124	Internal position command 2 pulse number high setting	-9999~9999	0	万个	P

Pn125	Internal position command 2 pulse number low setting	-9999~9999	0	个	P
Pn126	Internal position command 3 pulse number high setting	-9999~9999	0	万个	P
Pn127	Internal position command 3 pulse number low setting	-9999~9999	0	个	P
Pn128	Internal position instruction 0 running speed	0~3000	100	r/min	P
Pn129	Internal position instruction 1 running speed	0~3000	100	r/min	P
Pn130	Internal position instruction 2 running speed	0~3000	100	r/min	P
Pn131	Internal position instruction 3 running speed	0~3000	100	r/min	P
Pn132	Torque / speed control switching to position control	0~1	0	-	P
Pn133	Torque / speed control switching to position control deceleration time	5~10000	100	ms	P
Pn134	Fixed length displacement direction	0~1	0	-	P
Pn135	Fixed length shift height	0~9999	0	万个	P
Pn136	Fixed length shift low	0~9999	100	个	P
Pn137	Maximum running speed at fixed length	5~5000	200	r/min	P
Pn138	Fixed length locking release	0~1	1	-	P
Pn139	Vibration suppression ratio at stop	10~100	100	%	P
Pn140	The wait time is suppressed when the vibration is stopped	0~30000	300	ms	P
Pn141	Vibration suppression conditions at stop	0~10000	10	脉冲 pulse	P
Pn142~Pn145	Internal use	-	-	-	-

4.2.3 Speed control parameter

No.	Name	Range of values	Default value	Unit	Apply
Pn146◆	Speed command plus deceleration mode	0~2	1	-	S
Pn147◆	Ts Speed command, S curve, acceleration and deceleration time constant Ts	5~ 1500	80	ms	S
Pn148◆	Speed command, S curve, acceleration time constant, Ta	5~ 10000	80	ms	S
Pn149◆	Speed command, S curve, deceleration time constant Td	5~ 10000	80	ms	S
Pn150◆	Linear acceleration time constant	5~30000	80	ms	S
Pn151◆	Linear deceleration time constant	5~30000	80	ms	S
Pn152▲	Speed detection filter time constant	1~380	1	0.1ms	All
Pn153	Speed regulator proportional gain 1	1~ 2000	80	Hz	All
Pn154	Speed regulator integration time constant 1	1~ 5000	150	0.1ms	All
Pn155	Speed regulator proportional gain 2	1~ 2000	80	Hz	All
Pn156	Speed regulator integration time constant 2	1~ 5000	150	0.1ms	All
Pn157▲	Simulated speed, instruction smoothing, filtering time	1~500	1	0.1ms	S
Pn158	Analog speed command gain	1~1500	300	r/min/V	S
Pn159	Analog speed shift adjustment	-5000~5000	0	mv	S
Pn160	Analog speed direction	0~1	0	-	S
Pn161	Analog speed command force zero interval upper limit	0~1000	0	10mv	S
Pn162	Analog speed command forced zero interval lower bound	-1000~0	0	10mv	S
Pn163	Zero speed clamping lock mode	0~1	0	-	S
Pn164	Zero speed clamping trigger mode	0~1	0	-	S
Pn165	Zero speed clamping level	0~200	6	r/min	S
Pn166	Zero speed clamping deceleration	5~10000	50	ms	S

	time				
Pn167	Internal position regulator gain	1~2000	100	1/S	All
Pn168	Speed command source selection	0~2	0	-	S
Pn169	Internal speed command 1	-5000~5000	0	r/min	S
Pn170	Internal speed command 2	-5000~5000	0	r/min	S
Pn171	Internal speed command 3	-5000~5000	0	r/min	S
Pn172	Internal speed command 4	-5000~5000	0	r/min	S
Pn173	Internal speed command 5	-5000~5000	0	r/min	S
Pn174	Internal speed command 6	-5000~5000	0	r/min	S
Pn175	Internal speed command 7	-5000~5000	0	r/min	S
Pn176	Internal speed command 8	-5000~5000	0	r/min	S
Pn177	JOG speed	0~5000	200	r/min	S
Pn178	JOG Acceleration time	5~ 10000	100	ms	S
Pn179	JOG Deceleration time	5~ 10000	100	ms	S
Pn180~ Pn181	Internal use	-	-	-	-
Pn182◆	Speed loop PDFF control factor	0~100	100	-	PS
Pn183~	Speed feedback compensation	0~100	0	%	PS
Pn184~ Pn185	Internal use	-	-	-	-

4.2.4 Torque control parameter

NO..	Name	Range of values	Default value	Unit	Apply
Pn186	Torque command acceleration and	0~1	0	-	T

	deceleration mode				
Pn187▲	Torque command linear acceleration and deceleration time constant	1~30000	1	ms	T
Pn188▲	Simulated torque command smoothing filtering time	1~500	5	0.1ms	T
Pn189	Analog torque command gain	1~300	30	%/V	T
Pn190	Analog torque command offset adjustment	-1500~1500	0	mv	T
Pn191	Analog torque direction	0~1	0	-	T
Pn192	Torque Q shaft regulator proportional gain 1	5~ 2000	100	%	All
Pn193	Torque Q axis regulator integration time constant 1	5~ 2000	100	%	All
Pn194	Torque Q shaft regulator proportional gain 2	5~ 2000	100	%	All
Pn195	Torque Q axis regulator integration time constant 2	5~ 2000	100	%	All
Pn196	Torque instruction filtering time constant 1	1~5000	40	0.01ms	All
Pn197	Torque instruction filtering time constant 2	1~5000	40	0.01ms	All
Pn198	Limiting speed during torque control	0~4500	2500	r/min	T
Pn199	Torque control, limited speed, source selection	0~2	0	-	T
Pn200	Internal torque 1	-300~300	0	%	T
Pn201	Internal torque 2	-300~300	0	%	T
Pn202	Internal torque 3	-300~300	0	%	T
Pn203	Internal torque 4	-300~300	0	%	T
Pn204	Torque command source	0~2	0	-	T
Pn205	Torque D axis regulator; proportional gain	5~2000	100	%	All
Pn206	Torque D axis regulator, integral time constant	5~2000	100	%	All

Pn207	Speed feedback adjustment factor	1~3000	100	-	T
Pn208	Tracking torque instruction to determine range of error 1	0~300	5	%	T
Pn209	Tracking torque instruction to determine range of error 2	0~300	2	%	T
Pn210	Decision time for speed limited output	0~2000	15	ms	T
Pn211~ Pn215	Internal use	-	-	-	-

4.2.5 Extended control parameter

NO.	Name	Range of values	Default value	Unit	Apply
Pn216▲	Absolute encoder usage selection	0~1	1	-	All
Pn217	Absolute encoder output line	16~16384	2500	线 line	All
Pn218	Absolute position data transfer mode for absolute encoder	0~1	0	-	All
Pn219	Multi turn overflow detection for absolute encoder	0~1	1	-	All
Pn220▲	SigIn5 port function allocation	-31~31	3	-	All
Pn221▲	SigIn6 port function allocation	-31~31	4	-	All
Pn222▲	SigIn7 port function allocation	-31~31	9	-	All
Pn223▲	SigIn8 port function allocation	-31~31	10	-	All
Pn224▲	SigIn9 port function allocation	-31~31	11	-	All
Pn225▲	SigIn10 port function allocation	-31~31	0	-	All
Pn226	SigIn5 port filtering time	1~1000	2	ms	All
Pn227	SigIn6 port filtering time	1~1000	2	ms	All
Pn228	SigIn7 port filtering time	1~1000	2	ms	All
Pn229	SigIn8 port filtering time	1~1000	2	ms	All
Pn230	SigIn9 port filtering time	1~1000	2	ms	All
Pn231	SigIn10 port filtering time	1~1000	2	ms	All
Pn232▲	SigOut5 port function allocation	-14~14	9	-	All
Pn233	Internal use	-	-	-	-

Pn234	Maximum pulse command frequency	20~2000	550	KHZ	P
Pn235	Pulse instruction digital filtering time	0~255	0	100ns	P
Pn236~ Pn239	Internal use	-	-	-	-
Pn240	Absolute encoder, forward soft forbidden, multi circle value	0~32000	0	圈 circle	All
Pn241	Absolute encoder, forward soft forbidden, single coil value	0~9999	0	0.0001 圈 circle	All
Pn242	Absolute encoder, reverse soft forbidden, multi circle value	0~32000	0	圈 circle	All
Pn243	Absolute encoder, reverse soft inhibit, single coil value	0~9999	0	0.0001 圈 circle	All
Pn244	regression, positioning, approach range	0~3000	20	个	All
Pn245~ Pn256	Internal use	-	-	-	-
Pn257	Load inertia ratio	0.00~100.00	1.00	倍 times	PS
Pn258	Gain adjustment mode	0~1	0	-	PS
Pn259	Rigid grade selection	0~20	5	-	PS
Pn260	Real-time estimation method of inertia	0~1	0	-	All
Pn260~ Pn262	Internal use	-	-	-	-
Pn263◆	Inertia estimation acceleration and deceleration time	20~500	80	ms	All
Pn264◆	Inertia estimation allows maximum speed	150~1000	400	r/min	All
Pn265◆	Inertia estimation pause interval	0~10000	500	ms	All
Pn266◆	Inertia estimation; inertia ratio; prediction value	1.00~20.00	3.00	倍 times	All
Pn267▲	Rated torque of motor	0~320.00	0	N•m	All
Pn268▲	Maximum output torque of motor	0~300.00	0	倍 times	All

Pn269▲	Motor moment of inertia	0~320.00	0	Kg•M^2•10^-4	All
Pn270▲	Motor torque coefficient	0~100.00	0	N•m/Arms	All
Pn271▲	Maximum motor speed	80~5500	80	r/min	All
Pn272~ Pn275	Internal use	-	-	-	-
Pn276	Open programmable motion controller	0~1	0	-	All
Pn277~Pn 280	Internal use	-	-	-	-

4.3 Parameter detail

4.3.1 system parameter

NO.	Name	Range of values	Default value	Unit	Apply
Pn000	Parameter editing and initialization	0~3	1		All

Setting value	function
0	Parameter initialization prohibited
1	Allows parameter initialization, but does not initialize Pn001, Pn080, Pn159, Pn190, and other application independent functional parameters.
2	Restore settings before shipment.
3	Press button to view mode and cannot modify parameters.

No.	Name	Range of values	Default value	Unit	Apply
Pn001▲	Motor code	0-70	7		All
	The motor code must be set up with the motor, so that the motor can work properly.				

The 220V drive model and the motor model adaptation sheet are as follows:

Motor mode	Pn001	Rated speed (r/min)	Rated torque (N.M)	Rated power (KW)	KRS 15	KRS 20A	KRS 30A	KRS 50A	KRS 75A

60st_m00630	0	3000	0.6	0.2	√	√	√		
60st_m01330	1	3000	1.3	0.4	√	√	√		
60st_m01930	2	3000	1.9	0.6	√	√	√		
80st_m01330	3	3000	1.3	0.4	√	√	√		
80st_m02430	4	3000	2.4	0.75	√	√	√		
80st_m03520	5	2000	3.5	0.73	√	√	√		
80st_m04025	6	2500	4	1	√	√	√		
90st_m02430	7	3000	2.4	0.75	√	√	√		
90st_m03520	8	2000	3.5	0.73	√	√	√		
90st_m04025	9	2500	4	1	√	√	√		
110st_m02030	10	3000	2	0.6	√	√	√		
110st_m04020	11	2000	4	0.8	√	√	√		
110st_m04030	12	3000	4	1.2		√	√		
110st_m05030	13	3000	5	1.5			√		
110st_m06020	14	2000	6	1.2	√	√	√		
110st_m06030	15	3000	6	1.8			√		
130st_m04025	16	2500	4	1	√	√	√		
130st_m06015	17	1500	6	1	√	√	√		
130st_m05025	18	2500	5	1.3		√	√		
130st_m06025	19	2500	6	1.5			√		
130st_m07725	20	2500	7.7	2			√		
130st_m10010	21	1000	10	1	√	√	√		
130st_m10015	22	1500	10	1.5		√	√		
130st_m10025	23	2500	10	2.6			√	√	√
130st_m15015	24	1500	15	2.3			√		
130st_m15025	25	2500	15	3.8				√	√
150st_m15025	26	2500	15	3.8				√	√
150st_m15020	27	2000	15	3				√	√
150st_m18020	28	2000	18	3.6				√	√
150st_m23020	29	2000	23	4.7				√	√
150st_m27020	30	2000	27	5.5					√
180st_m17215	31	1500	17.2	2.7				√	√
180st_m19015	32	1500	19	3			√	√	√
180st_m21520	33	2000	21.5	4.5				√	√

180st_m27010	34	1000	27	2.9				√	√
220st_m67010	35	1000	67	7					√
180st_m35015	37	1500	35	5.5					√
40st_m00330	39	3000	0.3	0.1	√	√	√		

The 380V drive model and the motor model adaptation sheet are as follows:

Motor mode	Pn001	Rated speed (r/min)	Rated torque (N.M)	Rated power (KW)	KRS 25	KRS 40	KRS 50	KRS 75
180st_m48020	46	2000	48	10			√	√
180st_m19020	47	2000	19	4		√	√	√
180st_m35020	48	2000	35	7.3		√	√	√
180st_m27020	49	2000	27	5.6		√	√	√
180st_m48015	50	1500	48	7.5			√	√
180st_m19015	51	1500	27	3		√	√	√
180st_m21520	52	2000	27	4.5		√	√	√
180st_m27010	53	1000	27	2.9		√	√	√
180st_m27015	54	1500	27	4.3		√	√	√
180st_m35010	55	1000	35	3.7		√	√	√
180st_m35015	56	1500	35	5.5		√	√	√

NO.	Name	Range of values	Default value	Unit	Apply
Pn002▲	Control mode	0~5	2		All

Setting value	control mode
0	Torque mode
1	Speed mode
2	Location mode
3	Position / speed mode
4	Position / torque model
5	Speed / torque mode

	• When set to 3, 4, and 5, switching between modes is determined by the Cmode signal status of the input port SigIn. • For control mode switching, see Appendix B

No.	Name	Range of values	Default value	Unit	Apply
Pn003	Servo enable mode	0~1	0		All

Setting value	function
0	The SON enable drive from the input port SigIn
1	Automatically enable drive after power on

No.	Name	Range of values	Default value	Unit	Apply
Pn004	Servo disconnect enable shutdown mode	0~2	0		All

When the enable signal changes from valid to invalid, the motor can be stopped operating:

Setting value	Electromagnetic brake	Deceleration stop	Explain
0	Not used	Not used	Inertia stop
1	Not used	Use	Slow down and stop. The deceleration time is determined by Pn005
2	Use	Not used	Electromagnetic braking mode parking (suitable for motors with electromagnetic brakes)

No.	Name	Range of values	Default value	Unit	Apply

Pn005	Break down to slow down	5-10000	100	ms	All
	When the signal is changed from valid to invalid, the motor is slowed down to zero. In the deceleration process, if the enable signal is effective again, the motor will slow down to zero				

No.	Name	Range of values	Default value	Unit	Apply
Pn006	Use / do not use positive and negative drive prohibited	0-3	0		All
	To set the parameter value, you can choose to use or not use the drive disable function. The truth table is as follows:				

Setting value	Forward drive inhibit	Reverse drive inhibit
0	Not used	Not used
1	Not used	Use
2	Use	Not used
3	Use	Use

No.	Name	Range of values	Default value	Unit	apply
Pn007	Positive / reverse drive, no stopping, deceleration time	0-10000	60	ms	All
	When a overrun occurs, the SigIn port is either ccwl or CWL, and Pn077 is used to set the OFF alarm. Over time, the motor can decelerate in accordance with the deceleration time, while clearing the position command pulse (position control), after stopping, the internal position is locked. The internal position gain is adjusted via the Pn167.				

No.	Name	Range of values	Default value	Unit	Apply

Pn008	Internal forward torque limit (CCW)	0-300	300	%	All
Pn009	Internal reverse torque limit (CW)	-300~0	-300	%	All
Pn010	External forward torque limit (CCW)	0-300	300	%	All
Pn011	External reverse torque limit (CW)	-300~0	-300	%	All
	• set the torque limit in the motor CCW/CW direction. When the internal and external torque limits are in effect, the actual torque is taken as a smaller limit. • the external torque limit is controlled by the SigIn port TCCWL and TCWL. • The maximum output torque of some motors is two times the rated torque, and the maximum torque output of the motor is limited to two times the rated torque automatically.				

No.	Name	Range of values	Default value	Unit	Apply
Pn012	Forward (CCW) torque overload 1 alarm level	0-300	200	%	All
Pn013	Reverse (CW) torque overload 1 alarm level	-300-0	-200	%	All
Pn014	Torque overload 1 alarm detection time	1-900	250	100ms	All
Pn015	Overload 2 detection time	1-300	80	100ms	All
	• Overload 1 alarm level refers to the percentage of overload overcurrent relative to the rated output current of the motor. The overload capacity is between 0 and the maximum output current. Overload 1 overload capacity defaults to 2 times torque, in the set time, if more than 2 times the output torque, will perform overload 1 protection. • During the set time, when the motor reaches the rated torque output multiples, the overload 2 protection will be carried out. • If the overload level setting is greater than the corresponding internal				

	/ external torque limit values, overload conditions may not be met and protection will not work.

No.	Name	Range of values	Default value	Unit	适用 Apply
Pn016▲	Molecular DA for frequency division output of an incremental encoder	1~127	1		All
Pn017▲	The denominator of frequency division output of incremental encoder DB	1~127	1		All
	The output ratio of the incremental encoder is used to segment the pulse signal of the encoder, and only applies to the servo unit with incremental encoder. Frequency division must be satisfied: DA/DB>=1. For example, the encoder is 2500 lines and the frequency division value is DA/DB=25/8. Then the number of lines after dividing is 2500/ (DA/DB) =2500/ (25/8) = 800 lines.				

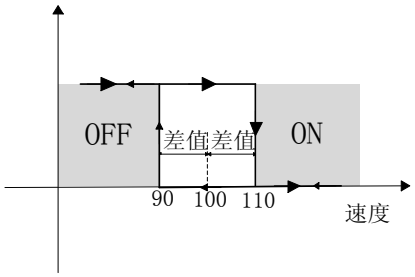
No.	Name	Range of values	Default value	Unit	Apply
Pn018▲	Encoder output pulse AB phase logic inversion	0-1	0		All

Setting value	Function
0	The motor counter clockwise rotation A ahead B; clockwise rotation before B ultrasonic A
1	The motor rotates counterclockwise A before the B ultrasonic; clockwise rotation A ahead of B

No.	Name	Range of values	Default value	Unit	Apply

Pn019▲	Rated current setting	0.0-100.0	0	Arms	All
Pn020▲	Rated speed setting	0~5000	额定转速	r/min	All
	If the parameter is set to 0, the default value set by the manufacturer is used; otherwise, the user must set the parameter value strictly according to the rated current, the effective value and the rated speed of the motor and the corresponding internal and forward torque limit values. The motor will not operate properly if it is improperly set up. Depending on the drive type and the motor code, the maximum actual current value available is different. General users, please do not modify				

No.	Name	Range of values	Default value	Unit	Apply
Pn021	Reach a predetermined speed	0~5000	500	r/min	All
Pn022	Arrive at a predetermined speed, lag, compare difference	0~5000	30	r/min	All
Pn023	Arrive at a predetermined speed, direction of detection	0-2	0		All
Pn023	• When the motor speed exceeds the set decision value, the Sreach of the output port SigOut will be converted to ON, otherwise OFF. • The comparator has hysteresis comparison characteristics. The value of the difference setting is too small, the higher the output signal turn off frequency is, the larger the setting value is, the smaller the turn off frequency is, but at the same time the resolution of the comparator is reduced. Example: the preset speed is set to 100, and the difference is set to 10.				



speed

• You can set the speed detection direction as follows:

Pn023	comparator
0	Reverse and reverse detection
1	Only positive rotation speed is detected; when reversal, the signal is OFF
2	The reverse speed is detected only. When the signal is positive, the signal is OFF

No.	Name	Range of values	Default value	Unit	Apply
Pn024	Arrival torque	0-300	100	%	All
Pn025	Lag difference between arrival torque and preset torque	0-300	5	%	All
Pn026	Reach the desired torque direction	0-2	0		All

•

When the operating torque of the motor exceeds the set decision value, the Treach of the output port SigOut will be converted to ON, or not OFF。

• Torque detection direction can be set as follows:

Pn026	comparator
0	Reverse and reverse detection
1	Only positive torque is detected; when reversal, the signal is OFF.

	2	Reverse torque is detected only when the forward turn signal is OFF.	

No.	Name	Range of values	Default value	Unit	Apply
Pn027	Zero velocity detection range set	0~1000	10	r/min	All
Pn028	Zero speed test return error	0~1000	5	r/min	All
	When the motor speed is lower than the set speed value, the zerospeed of the output port SigOut is changed to ON, otherwise OFF.				

No.	Name	Range of values	Default value	Unit	Apply
Pn029	Zero speed detection point of motor electromagnetic brake	0~1000	5	r/min	All
	Only when the electromagnetic brake function is used, will the motor be judged to be a zero speed state.				

No.	Name	Range of values	Default value	Unit	Apply
Pn030	Delay time of electromagnetic brake when the motor is stationary	0~2000	0	Ms	All
	• When the motor is stationary, the electromagnetic brake starts the delay time of the motor to cut off the current. • When using the electromagnetic braking function, the servo break enable mode Pn004 must be set to 2.				

No.	Name	Range of values	Default value	Unit	Apply

Pn031	When the motor is running, the electromagnetic brake wait time	0~2000	500	ms	All
	When the motor is running, the motor breaks the current to the time between the brake of the electromagnetic brake.				

No.	Name	Range of values	Default value	Unit	Apply
Pn032	The speed of the electromagnetic brake when the motor is running	0-3000	30	r/min	All
	When the motor is running, when the motor is less than the speed set by this parameter, the magnetic brake starts to brake.				

No.	Name	Range of values	Default value	Unit	Apply
Pn033	Origin regression trigger mode	0~3	0		All

Setting value	function
0	Turn off the origin regression function
1	Triggered by the GOH level of the input port SigIn
2	Triggered by the rising edge of the input port SigIn GOH
3	Automatic execution of power on

• The origin regression method is shown in Appendix F.

No.	Name	Range of values	Default value	Unit	Apply
Pn034	Origin regression reference point mode	0~6	0		All

Setting value	Function
0	The REF is turned (triggered by the rising edge) as the reference point
1	Flip for REF (rising edge trigger) as reference point
2	The CCWL is being turned (triggered by the falling edge) as the reference point
3	Reverse find CWL (drop edge trigger) as reference point
4	The Z pulse is being turned to the reference point
5	Turn the Z pulse for reference point
6	Absolute zero as reference point

Note: when CCWL or CWL is used as a reference point, you need to set the Pn006 parameter and turn on the function.

No.	Name	Range of values	Default value	Unit	Apply
	Origin regression origin mode	0~2	0		All

Pn035	

Setting value	Function
0	Look for the origin of the Z pulse backwards
1	Look for the origin of the Z pulse forward
2	The origin is raised directly at the rising edge of the reference point

No.	Name	Range of values	Default value	Unit	Apply
Pn036	Origin position offset high	-9999~9999	0	ten thousand pulse	All
Pn037	Origin position offset low	-9999~9999	0	pulse	All
	找到原点后，加上偏移量(Pn036*10000+ Pn037)作实际原点。When the origin is found, the offset (Pn036*10000+, Pn037) is added as the actual origin.				

No.	Name	Range of values	Default value	Unit	Apply
Pn038	Origin regression first speed	1~3000	200	R/min	All
Pn039	Origin regression second speed	1~3000	50	R/min	All
	When the origin return operation is performed, the reference point is searched at the first speed, and the original point is searched at the second speed after reaching the reference point. Second the speed should be less than the first speed.				

No.	Name	Range of values	Default value	Unit	Apply
Pn040	Origin regression acceleration time	5~10000	50	ms	All
Pn041	Origin regression deceleration time	5~10000	50	ms	All
	In origin regression execution, the motor is accelerated from zero to the rated speed and is used only for origin return operations.				

No.	Name	Range of values	Default value	Unit	Apply
Pn042	Origin on time delay	0~3000	60	ms	All
	After reaching the origin, the motor is completely stationary for a period of time delay. After completion of the delay, the HOME output of the output port SigOut is changed to ON.				

No.	Name	Range of values	Default value	Unit	Apply
Pn043	The origin regression completes the signal delay	5~3000	80	ms	All
	HOME sustained effective time				

No.	Name	Range of values	Default value	Unit	Apply
Pn044	Origin return instruction execution mode	0~1	0		All

Setting value	Function
0	When the origin return is complete, wait for the HOME signal to become OFF, then receive and execute instructions.
1	When the origin return is complete, the instruction is received and executed immediately.

No.	Name	Range of values	Default value	Unit	Apply
	Gain switching selection	0~5	0		All

Pn045	<table><tr><th>Setting value</th><th>Funtion</th></tr><tr><td>0</td><td>Fixed first gain.</td></tr><tr><td>1</td><td>Fixed second gain.</td></tr><tr><td>2</td><td>Controlled by the Cgain terminal of the input port SigIn, the OFF is first gain and the ON is second gain.</td></tr><tr><td>3</td><td>Controlled by the speed command, when the speed command exceeds Pn046, the switch is switched to first gain</td></tr><tr><td>4</td><td>When the position deviation exceeds Pn046, the switch is switched to first gain by pulse bias control.</td></tr><tr><td>5</td><td>Controlled by the motor speed, when the position deviation exceeds Pn046, the switch is switched to first gain.</td></tr></table> • Gain switching is shown in Appendix A

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No.	Name	Range of values	Default value	Unit	Apply
Pn046	Gain switching level	0~30000	80		All
Pn047	Gain switching back difference	0~30000	6		All
	Depending on the setting of the Pn045 parameter, the conditions and units for switching are different: <table><tr><td>Pn045</td><td>Gain switching condition</td><td>Unit</td></tr><tr><td>3</td><td>Speed command</td><td>r/min</td></tr><tr><td>4</td><td>Pulse deviation</td><td>Pulse</td></tr><tr><td>5</td><td>motor speed</td><td>r/min</td></tr></table>				

No.	Name	Range of values	Default value	Unit	Apply
Pn048	Gain switching delay	0~20000	20	0.1ms	All

	time				
	The gain switching condition satisfies the delay time of the start switch. If the switch condition is detected during the delay phase, the switchover is canceled.				

No.	Name	Range of values	Default value	Unit	Apply
Pn049◆	Gain switching time 1	0~15000	0	0.1ms	All
Pn050◆	Gain switching time 2	0~15000	50	0.1ms	All
	When the gain is switched, the current gain combination is linearly smoothed at this time, gradually varying to the target gain combination, and each parameter in the combination varies simultaneously.				

No.	Name	Range of values	Default value	Unit	Apply
Pn051	Maximum speed limit for motor operation	0~5000	3000		All
	Used to limit the maximum speed of motor operation. The setting value shall be less than or equal to the rated speed, otherwise the maximum speed at which the motor can run is rated speed.				

No.	Name	Range of values	Default value	Unit	Apply
Pn052▲	SigIn1 port function allocation	-31~31	1		All
Pn053▲	SigIn2 port function allocation	-31~31	2		All
Pn054▲	SigIn3 port function allocation	-31~31	19		All
Pn055▲	SigIn4 port function allocation	-31~31	8		All
Pn220▲	SigIn5 port function	-31~31	3		All

	allocation				
Pn221▲	SigIn6 port function allocation	-31~31	4		All
Pn222▲	SigIn7 port function allocation	-31~31	9		All
Pn223▲	SigIn8 port function allocation	-31~31	10		All
Pn224▲	SigIn9 port function allocation	-31~31	11		All
Pn225▲	SigIn10 port function allocation	-31~31	0		All
	• Specific function allocation, refer to SigIn function detailed table. • -1~-31 function number is 1-31 function number, the corresponding negative logic function is the same, the effective level is opposite.				

Setting value	SigIn input level	SigIn corresponding function number
Positive	Low level	ON
	High level	OFF
negative	Low level	OFF
	High level	ON

No.	Name	Range of values	Default value	Unit	Apply
Pn056	SigIn1 port filtering time	1~1000	2	ms	All
Pn057	SigIn2 port filtering time	1~1000	2	ms	All
Pn058	SigIn3 port filtering time	1~1000	2	ms	All
Pn059	SigIn4 port filtering time	1~1000	2	ms	All
Pn226	SigIn5 port filtering time	1~1000	2	ms	All
Pn227	SigIn6 port filtering time	1~1000	2	ms	All
Pn228	SigIn7port filtering time	1~1000	2	ms	All

Pn229	SigIn8 port filtering time	1~1000	2	ms	All
Pn230	SigIn9 port filtering time	1~1000	2	ms	All
Pn231	SigIn10 port filtering time	1~1000	2	ms	All
	Perform digital filtering on the input port SigIn.				

No.	Name	Range of values	Default value	Unit	Apply
Pn060▲	SigOut1 port function allocation	-14~14	2		All
Pn061▲	SigOut2 port function allocation	-14~14	1		All
Pn062▲	SigOut3 port function allocation	-14~14	4		All
Pn063▲	SigOut4 port function allocation	-14~14	7		All
Pn232▲	SigOut3 port function allocation	-14~14	9		All
Pn233▲	SigOut4 port function allocation	-14~14	10		All

parameter values	Corresponding function number	SigOut output results
Positive	ON	Low level
	OFF	High level
negative	OFF	Low level
	ON	High level

Specific function allocation, refer to SigOut function detailed table.

No.	Name	Range of values	Default value	Unit	Apply
	communication mode	0-2	2		All

Pn064▲	<table><tr><th>Setting value</th><th>Function</th></tr><tr><td>0</td><td>No communication</td></tr><tr><td>1</td><td>RS-232</td></tr><tr><td>2</td><td>RS-485</td></tr></table> ・The communication protocol is detailed in the seventh chapter Modbus communication function

No.	Name	Range of values	Default value	Unit	Apply
Pn065	Communication station	1-254	1		All
	When using Modbus communication, each group of drivers should set different site numbers in advance. If the site number is repeatedly set, the communication will be paralyzed.				

No.	Name	Range of values	Default value	Unit	Apply
Pn066▲	Communication baud rate	0-5	5		All

Setting value	baud rate
0	4800
1	9600
2	19200
3	38400
4	57600
5	115200

No.	Name	Range of values	Default value	Unit	Apply
	Communication mode setting	0-8	8		All

Pn067▲	The parameter values are defined in the following table, as shown in Chapter seventh, Modbus communication function

Set up	format
0	7 , N , 2 (Modbus ,ASCII)
1	7 , E , 1 (Modbus , ASCII)
2	7 , O , 1 (Modbus , ASCII)
3	8 , N , 2 (Modbus , ASCII)
4	8 , E , 1 (Modbus , ASCII)
5	8 , O , 1 (Modbus , ASCII)
6	8 , N , 2 (Modbus , RTU)
7	8 , E , 1 (Modbus , RTU)
8	8 , O , 1 (Modbus , RTU)

No.	Name	Range of values	Default value	Unit	Apply
Pn068	The input function control mode selects the register 1	0~32767	0		All
Pn069	The input function control mode selects the register 2	0~32767	0		All

• Certain functions are controlled by means of communication or port input. If the communication mode is not controlled, 0 can be set.

• Pn068 parameter:

BIT	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Function	ZeroLock	EMG	TCW	TCCW	CWL	CCWL	Alarmrst	Son
Default value	0	0	0	0	0	0	0	0

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
Retain	Cgain	Cmode	TR2	TR1	Sp3	Sp2	Sp1
0	0	0	0	0	0	0	0

• Pn069 参数：Pn069 parameter:

BIT	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Function	REF	GOH	PC	INH	Pclear	Cinv	Gn2	Gn1
Default value	0	0	0	0	0	0	0	0

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
Retain	Punlock	Pdistance	Psource	pstop	ptriger	Pos2	Pos1
0	0	0	0	0	0	0	0

- In communication control, the above functions are determined by the input port on the CN2 or by the communication control. Set to 0, the control is changed by the input port on the CN2; set to 1, then changed by the communication control. The default is entirely controlled by the input port. For example: son SP3 SP2 SP1 function through the communication control and other control through the input port, the setting value is 00000111_00000001 (binary) / 0x0701 (sixteen m) -->1793 (decimal), so set the Pn068 parameter to 1793.

No.	Name	Range of values	Default value	Unit	Apply
Pn070	Input function logic status setting register 3	0~32767	32691		All
Pn071	Input function logic status setting register 3	0~32767	32767		All

- When RS232 or RS485 communication is carried out, Pn068 is set up, and the corresponding bits of Pn069 are controlled by communication, and the position of the corresponding parameter is set or cleared to control the status of the input function signal. Logical 0 is valid.

• Pn070 parameter:

position	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Function	ZeroLock	EMG	TCW	TCCW	CWL	CCWL	Alarmrst	Son
Default value	1	0	1	1	0	0	1	1

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
Retain	Cgain	Cmode	TR2	TR1	Sp3	Sp2	Sp1
0	1	1	1	1	1	1	1

• Pn071 parameter:

Position	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Functional signal	REF	GOH	PC	INH	Pclear	Cinv	Gn2	Gn1
Default value	1	1	1	1	1	1	1	1

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
Retain	Punlock	Pdistance	Psource	Pstop	Ptriger	Pos2	Pos1
0	1	1	1	1	1	1	1

• In the communication control mode, by setting the bits of this register, we can achieve the effect of CN2 external input signal control. For example: the driver in the position control mode, to prohibit the pulse command, set the Pn071 BIT4 settings 0, then the input pulse becomes invalid. Non communication control, set the value of the reference, are invalid.

Note: each time the power is on, the drive automatically loads the values of the Pn070, Pn071 registers, and executes the corresponding operations immediately. Therefore, before the enable motor, the input function signal is determined to enter the correct working state.

No.	Name	Range of values	Default value	Unit	Apply
Pn072	The input function control mode selects the register 3	0~1	0		All
Pn073	Input function logic status setting register 3	0~1	1		All

• Pn072 parameter:

Position	BIT15~BIT1	BIT0
Function	Retain	Sen
Default value	0	0

• Pn073 parameter

Position	BIT15~BIT1	BIT0
Function	Retain	Sen
Default value	0	1

No.	Name	Range of values	Default value	Unit	Apply
Pn074	Fan opening temperature	30~70	50	℃	All
Pn075	Fan operation mode	0~2	0		All

Pn075	Fan operation mode
0	Temperature sensing automatic operation
1	Boot operation
2	Close

No.	Name	Range of values	Default value	Unit	Apply
Pn076	Emergency shutdown (EMG) reset mode	0-1	0		All

• Clear the EMG (AL-14) alarm condition after the EMG status OFF is lifted:

• In the enabling ON state, if the external command input, the EMG alarm is

Setting value	Function
0	The servo must enable the OFF to be cleared by manual or port SigIn:AlarmRst.
1	No matter the servo enable ON or OFF, the EMG changes to ON again and will be automatically cleared.

automatically cleared, the instructions are executed immediately.

No.	Name	Range of values	Default value	Unit	Apply
Pn077	Positive / reverse drive forbidden detection	0-2	0		All

If you use the ccwl or CWL function, when ccwl or CWL is the OFF state, you can set whether or not to issue a AL-15 alarm:

Setting value	function
0	Do not alarm, slow down and stop.
1	When the motor is running, when the deceleration is

	stopped, the alarm is sent out, and the motor is no longer energized.
2	Alarm immediately, motor power off, free stop.

No.	Name	Range of values	Default value	Unit	Apply
Pn078	Undervoltage detection	0~1	1		All

Setting value	Function
0	Not detected
1	detection

No.	Name	Range of values	Default value	Unit	Apply
Pn079	System status display project selection	0-30	0		All

After the drive is powered on, automatically enter the monitor mode menu Dn000 submenu. By default, the state display system according to the manufacturer the way (motor speed), the user can set the parameter values, the Dn000 display system state specific parameters, specifically refer to "monitor model list".

0 system defaults (motor speed)1 speed command 2 average torque 3 position deviation 4 AC power supply voltage 5 maximum instantaneous torque 6 pulse input frequency 7 heat sink temperature 8 current motor speed

9 the effective input command pulse accumulated value is low

10 the effective input command pulse accumulation value is high

11 position control, the encoder effective feedback pulse accumulated value is low

12 position control, the encoder effective feedback pulse accumulation value is high

13 regenerative braking load rate

14 input port signal status 15 output port signal status

16 analog torque command voltage 17 analog speed command voltage

18 output function status register

	19 after servo power on, the encoder feedback pulse accumulated value is low 20 servo power on, the encoder feedback pulse accumulation value is high 21 drive software version 22 encoder UVW letter 23 rotor absolute position 24 drive type 25 absolute encoder single loop low data 26 absolute encoder single loop data high 27 absolute encoder multi ring data low 28 absolute encoder multi ring data high 29 load inertia ratio display

No.	Name	Range of values	Default value	Unit	Apply
Pn080	Incremental encoder line number	0~16000	0	line	All
	• The number of encoders mounted on the motor shaft. Setting values must be specified with the encoder line number nominal values are exactly the same, the motor angle encoder installation and wiring connection with defined drive, otherwise blocking of the motor run or position deviation and other non normal instruction execution. General users do not need to modify this parameter, the default value can be. If the encoder is absolute encoder, this parameter setting is invalid. • When 0 values are taken, it is the line value of the motor standard encoder.				

No.	Name	Range of values	Default value	Unit	Apply
Pn081	User parameter permanent write operation	0-1	0		All
	Corresponding auxiliary mode Fn001 operation. Writes all parameter values of the current Pn000~Pn219 to EEPROM. When the parameter value is changed from 0 to 1, the driver will execute a write operation. This operation is only valid when communicating (Pn064>0).				

No.	Name	Range of values	Default value	Unit	Apply

Pn082	SigOut port forced output	0~4095	0		All

• Force the SigOut port to output the fixed level. By setting this parameter, the output level of the output port is forced.

	Retain	SigOut5	SigOut4		SigOut3		SigOut2		SigOut1	
position	BIT15~BIT10	BIT19~BIT8	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Default value	0	0	0	0	0	0	0	0	0	0

The output port truth table is as follows:

SigOut2			SigOut1		
BIT3	BIT2	Output level	BIT1	BIT0	Output level
0	0	Non coercive state	0	0	Non coercive state
0	1	Forced high level	0	1	Forced high level
1	0	Forced low level	1	0	Forced low level
1	1	Non coercive state	1	1	Non coercive state

SigOut4			SigOut3		
BIT7	BIT6	Output level	BIT5	BIT4	Output level
0	0	Non coercive state	0	0	Non coercive state
0	1	Forced high level	0	1	Forced high level
1	0	Forced low level	1	0	Forced low level
1	1	Non coercive state	1	1	Non coercive state

SigOut5		
BIT9	BIT8	Output level
0	0	Non coercive state
0	1	Forced high level
1	0	Forced low level
1	1	Non coercive state

Example: the output port SigOut2 forces the output to be low, and the other port states are not forced to output. The Pn082 parameter is set to 8.

No.	Name	Range of values	Default value	Unit	Apply
Pn083	Low voltage alarm detection amplitude	50~280	200	V	All
	When the bus voltage is below this amplitude, the Pn078 determines whether or not the alarm is given.				

No.	Name	Range of values	Default value	Unit	Apply
Pn084	High temperature alarm detection amplitude	0~100	70	℃	All
	When the heat sink temperature is higher than this amplitude, the alarm will be sent out. If set to 0, screen the alarm.				

No.	Name	Range of values	Default value	Unit	Apply
Pn085▲	Pole count of motor	0~100	0	Right	All
	Default value for the drive when the parameter is 0.				
No.	Name	Range of values	Default value	Unit	Apply
Pn087▲	Selection of braking resistance	0~2	1	-	All

Setting value	Function
0	No braking resistors are installed
1	Use built in brake resistors
2	Use an external braking resistor

No.	Name	Range of values	Default value	Unit	Apply
Pn088	Brake resistor regeneration overload alarm level	50~250	90	%	All
	• The higher the overload rate of the resistor regeneration, the higher the resistance surface temperature. • When the internal or external braking resistor, the regenerative braking load rate is lower than the alarm level, the overload alarm is not carried out. • Set Pn092=0, shield regeneration overload alarm.				

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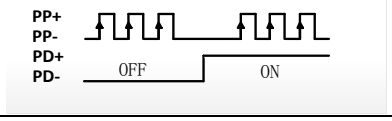
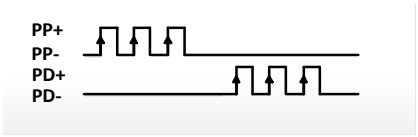
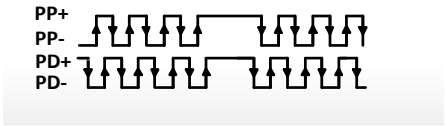
No.	Name	Range of values	Default value	Unit	Apply
Pn089▲	External braking resistance power	20~20000	100	W	All
Pn090▲	External braking resistance value	10~1000	100	Ω	All
Pn091	External brake resistance, regeneration, available capacity	5~75	20	%	All
	• When using an external braking resistor (Pn087=2), a nominal resistance, power value, and resistance must be set. • When the available capacity of the brake resistance is set, heat dissipation factors such as ambient temperature, ventilation intensity and resistance, heat dissipation characteristics must be taken into account, and the resistance shall be decreased. Braking resistor available capacity should not be too high, otherwise the resistance surface temperature up to several hundred degrees Celsius, burning resistance, causing fire. Please choose the brake resistor in safe condition. When the brake resistance is mounted on a large radiator, if it is naturally cooled, try to set 25%. If a strong wind blows, try setting 45%. After checking the system for a period of time, check whether the resistance temperature is too high. After repeated attempts, the regenerative overload alarm still occurs, while the resistance temperature is within the allowable range, and the Pn092=0 can be set, that is to say, no braking resistance is concerned.				

No.	Name	Range of values	Default value	Unit	Apply
Pn092	Overload detection of braking resistor	0~1	1	-	All

Setting value	function
0	Do not issue alarm when regenerative overload occurs
1	Issue alarm when regenerative overload occurs

4.3.2 Position control parameter

No.	Name	Range of values	Default value	Unit	Apply
Pn096▲	Command pulse input mode	0-2	0		P

Pn096		Direct order	Negative command
0	Pulse + direction		
1	Forward / reverse pulse		
2	Quadrature pulse		

No.	Name	Range of values	Default value	Unit	Apply
Pn097▲	Instruction pulse input direction logic selection	0-1	0		P

Setting value	Function
0	Enter the positive command and turn the motor counter clockwise (CCW)
1	Enter the positive command and turn the motor clockwise (CW)

No.	Name	Range of values	Default value	Unit	Apply
Pn098	Pulse electron gear ratio of molecule 1	1~32767	1		P
Pn099	Pulse electron gear ratio of	1~32767	1		P

	molecule 2				
Pn100	Pulse electron gear ratio of molecule 3	1~32767	1		P
Pn101	Pulse electron gear ratio of molecule 4	1~32767	1		P
Pn102 ▲	The denominator of a pulsed electronic gear ratio	1~32767	1		P
	The molecular N of the electronic gear ratio is determined by GN1, GN2 of the input port SigIn. Denominator fixing. Molecular selection follows:				

GN2	GN1	Electronic gear ratio, molecular N
OFF	OFF	Molecule 1
OFF	ON	Molecule 2
ON	OFF	Molecule 3
ON	ON	Molecule 4

No.	Name	Range of values	Default value	Unit	Apply
Pn103	The position deviation is out of range setting	1~2000	500	ten thousand pulse	P
	When the pulse number of the pulse deviation counter exceeds the set value (i.e., the difference between the current position and the target position), the driver sends out an alarm signal.				

No.	Name	Range of values	Default value	Unit	Apply
Pn104	Location positioning complete range setting	0~ 32767	10	pulse	P
Pn105	Location positioning complete backlash setting	0~ 32767	3	pulse	P
	When the residual pulse number of the offset counter is lower than the parameter setting value, the output port SigOut:: Preach signal is ON, otherwise				

	OFF.

No.	Name	Range of values	Default value	Unit	Apply
Pn106	Location positioning complete range setting	0~ 32767	300	pulse	P
Pn107	Location positioning complete backlash setting	0~ 32767	30	pulse	P
	When the residual pulse number of the offset counter is lower than the parameter setting value, the Pnear signal of the output port SigOut is ON, otherwise OFF.				

No.	Name	Range of values	Default value	Unit	Apply
Pn108	Position deviation clearing mode	0-1	1		P

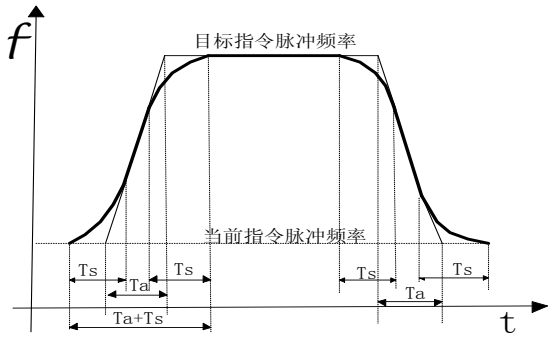
Position control, you can use the SigIn's Pclear function to clear the value

Setting value	Function
0	Pclear Level ON period
1	Pclear Rising edge time (from OFF to ON)

of the position offset counter. Positional error clearing occurs at:

o.	Name	Range of values	Default value	Unit	Apply
Pn109◆	Position command acceleration and deceleration mode	0-2	0		P

Setting value	Function
0	No filtering
1	One time smooth filtering
2	S shape filtering

No.	Name	Range of values	Default value	Unit	Apply
Pn110◆	Position instruction, primary filtering, time constant	5~500	50	ms	P
Pn111◆	Ta Position instruction, S shape filtering, time constant Ta	5~340	50	ms	P
Pn112◆	Ts Position instruction, S shape filtering, time constant Ts	5~150	20	ms	P
	• Filter time constant definition: the time from the current position, the instruction frequency, to the target instruction frequency. The longer the filtering time, the better the frequency smoothness of the position instruction, but the greater the instruction response delay. On the occasions of step change of the instruction pulse frequency, the motor is operated smoothly. Filtering has no influence on the number of instruction pulses. • Filter time T=Ta+Ts. Ta: straight part of time, the smaller the Ta, the faster the acceleration and deceleration. Ts: arc part time, the greater the Ts, the smoother the speed, the smaller the impact.  设置规则: $\frac{Ta}{2} \geq Ts$				

No.	Name	Range of values	Default value	Unit	Apply
Pn113	Position loop feedforward gain	0-100	0	%	P
Pn114▲	Position loop, feedforward filter, time constant	1-50	5	ms	P

	In position control, the position feedforward is directly applied to the speed command, which can reduce the tracking error of position and improve the response. If the feed forward gain is too large, it may cause velocity overshoot. The feedforward commands can be smoothed.

No.	Name	Range of values	Default value	Unit	Apply
Pn115	Position regulator gain 1	1-2000	100	1/S	P
Pn116	Position regulator gain 2	1-2000	100	1/S	P
	On the premise that the mechanical system does not produce vibration or noise, the position loop gain is increased to accelerate the reaction speed and shorten the positioning time.				

No.	Name	Range of values	Default value	Unit	Apply
Pn117	Location command source selection	0~3	0		P

Setting value	Function
0	External pulse input
1	Internal position instructions (see Appendix G)
2	The command source is determined by the SigIn:psource. On: internal position instruction; Off: external pulse input
3	Motion controller instruction

No.	Name	Range of values	Default value	Unit	Apply
Pn118	Internal position instruction pause mode selection	0~1	0		P

Setting value	Function
0	When the pstop trigger action is triggered again, the ptriger is driven according to the currently selected internal location command.
1	When the pstop trigger action is triggered again, the

		ptriger continues to complete the last remaining internal position command pulses.	

No.	Name	Range of values	Default value	Unit	Apply
Pn119	Internal position suspension deceleration time	0~10000	50	ms	P
	In the internal position control, when the falling edge of the pstop occurs, the motor will decelerate from the current running speed to 0, and its deceleration time can be set by this parameter (for internal position control only).				

No.	Name	Range of values	Default value	Unit	Apply
Pn120	Internal position command 0 pulse number high setting	-9999~9999	0	Tens of thousands pulse	P
Pn121	Internal position command 0 pulse number low setting	-9999~9999	0	one	P
Pn122	Internal position command 1 pulse number high setting	-9999~9999	0	Tens of thousands pulse	P
Pn123	Internal position command 1 pulse number low setting	-9999~9999	0	one	P
Pn124	Internal position command 2 pulse number high setting	-9999~9999	0	Tens of thousands pulse	P
Pn125	Internal position command 2 pulse number low setting	-9999~9999	0	one	P
Pn126	Internal position command 3 pulse number high setting	-9999~9999	0	Tens of thousands pulse	P

Pn127	Internal position command 3 pulse number low setting	-9999~9999	0	one	P
	Internal position instruction N (Mai Chongliang) = internal position command, N pulse number, high setting value * 10000 + internal position command, N pulse number, low setting value Example: encoder 2500 lines, to travel, 12.5 turn, then set Pn120=12, Pn121=5000.				

No.	Name	Range of values	Default value	Unit	Apply
Pn128	Internal position instruction 0 running speed	0~3000	100	r/min	P
Pn129	Internal position instruction 1 running speed	0~3000	100	r/min	
Pn130	Internal position instruction 2running speed	0~3000	100	r/min	P
Pn131	Internal position instruction3 running speed	0~3000	100	r/min	P
	When the internal position instruction N is executed, the maximum speed at which the motor can run is defined.				

No.	Name	Range of values	Default value	Unit	Apply
Pn132	Torque / speed control switching to position control	0~1	0		P

In dual mode control, when the control mode is switched from torque or speed mode to position control (Pn002=3 or 4), to avoid severe mechanical shock, the switch should be switched at a lower speed. Set the condition for switching:

Setting value	Function
0	(zerospeed)
1	Decelerate to zero

No.	Name	Range of values	Default value	Unit	Apply
Pn133	Torque / speed control switching to position control deceleration time	5-10000	100	ms	P
	Pn132=1, when the Cmode signal is valid, indicating that the control mode is switched from torque or speed control to position control, the motor is decelerated to zero first and then switched to position control mode. See the appendix B for specific timing.				

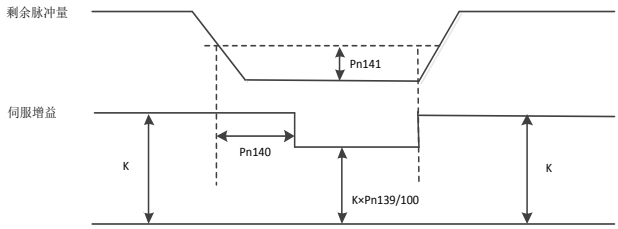
No.	Name	Range of values	Default value	Unit	Apply
Pn134	Fixed length displacement direction	0~1	0		P
	When the fixed length is moved, the direction of the motor rotation must be determined before the SigIn:Pdistance is triggered: • 0 : according to the current motor speed to determine the fixed length, displacement, rotation direction. The current rate is more than 0, fixed length displacement forward (CCW); the speed of <0, the fixed length displacement inversion (CW). • 1 : according to the current motor speed to determine the fixed length, displacement, rotation direction. The speed of >0, the fixed length displacement forward (CCW); the current rate is less than 0, fixed length displacement inversion (CW).				

No.	Name	Range of values	Default value	Unit	Apply
Pn135	Fixed length shift height	0~9999	0	Ten thousand	P
Pn136	Fixed length shift low	0~9999	100	individual	P
	When the SigIn:Pdistance is triggered, the motor shaft will rotate at a distance of Pn135*10000+Pn136 (pulse). The moving direction of the motor is determined by Pn134.				

No.	Name	Range of values	Default value	Unit	Apply
Pn137	Maximum running speed at fixed length	10~5000	200	r/min	P
	The maximum speed at which the motor is allowed to run during a fixed length.				

No.	Name	Range of values	Default value	Unit	Apply
Pn138	Fixed length locking release	0~1	1		P
	After the fixed length shift is completed, the motor is in a fixed length locking state, and is the normal response position instruction. There are two ways of releasing the motor: •0: no need to lock the signal, after the completion of fixed displacement, immediate response to position instructions. •1: must wait for the input port signal, the SigIn:Punlock signal is effective, only then can respond the position instruction.				

No.	Name	Range of values	Default value	Unit	Apply
Pn139	Vibration suppression ratio at stop	10~100	100	%	P
Pn140	The wait time is suppressed when the vibration is stopped	0~30000	300	ms	P
Pn141	Vibration suppression conditions at stop	0~10000	10	pulse	P
	The servo gain increases to a considerable extent, although vibration does not occur when moving, but vibration may occur after the stop. This function works only at stop time and suppresses vibration by reducing servo gain. Residual impulse				



Servo gain

Starting from the position command is stopped, when the impulse is lower than that of the Pn141 mountains left the set value, waiting for Pn140 time, internal servo gain attenuation. If the attenuation ratio is above 50%, if the low value is set, the vibration may also be reduced and vibration will occur.

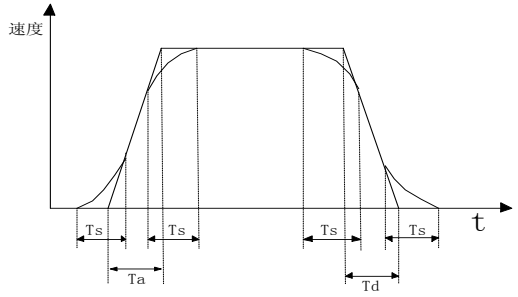
4.3.3 Speed control parameter

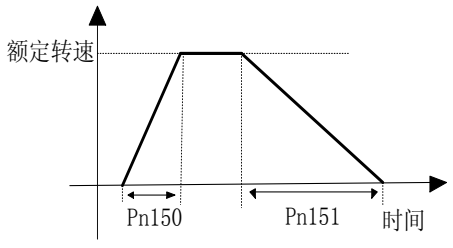
No.	Name	Range of values	Default value	Unit	Apply
Pn146◆	Speed command plus deceleration mode	0~2	1		S

Setting value	Function
0	NO Acceleration and deceleration
1	S curve acceleration and deceleration
2	Linear acceleration and deceleration

This parameter should be set to 0 in the speed control mode with an external position loop.

No.	Name	Range of values	Default value	Unit	Apply
Pn147◆	Speed command, S curve, acceleration and deceleration time constant Ts	5~ 1500	80	ms	S
Pn148◆	Speed command, S curve, acceleration time constant, Ta	5~ 10000	80	ms	S
Pn149◆	Speed command, S curve,	5~ 10000	80	ms	S

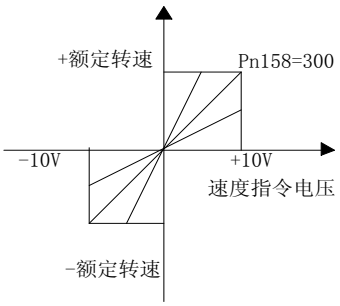
	deceleration time constant Td				
	• In the speed control mode, the acceleration and deceleration time of the speed command can be set to smoothly start and stop the servo motor. • Ta: acceleration time: time from 0r/min to rated speed. For example, the servo motor rated speed 3000r/min, if the set time is 3S, then the speed from 0r/min to 1000r/min is 1S. Td: deceleration time: reduced from rated speed to 0r/min time Ts: arc part time Speed  设置规则：$\frac{Ta}{2} \geq Ts, \frac{Td}{2} \geq Ts$ Set rules				

No.	Name	Range of values	Default value	Unit	Apply
Pn150◆	Linear acceleration time constant	5~30000	80	ms	S
Pn151◆	Linear deceleration time constant	5~30000	80	ms	S
	The acceleration time constant is defined as the time that the speed command rises from zero to the rated speed.  Rated speed time				

No.	Name	Range of values	Default value	Unit	Apply
Pn152 ▲	Speed detection filter time constant	1~380	1	0.1ms	All
	The greater the parameter value, the smoother the speed is detected, but the slower the rate response. Too large to cause oscillations; too small to cause noise.				

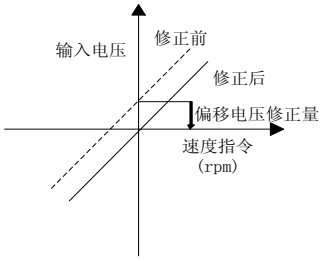
No.	Name	Range of values	Default value	Unit	Apply
Pn153	Speed regulator proportional gain 1	1~ 2000	80	Hz	All
Pn154	Speed regulator integration time constant 1	1~ 5000	150	0.1ms	All
Pn155	Speed regulator proportional gain 2	1~ 2000	80	Hz	All
Pn156	Speed regulator integration time constant 2	1~ 5000	150	0.1ms	All
	• The gain of the speed loop controller directly determines the response bandwidth of the speed control loop, and increases the speed loop gain when the mechanical system does not generate vibration or noise, and the speed response is accelerated. • The integral time constant is used to adjust the compensation speed of steady state error, reduce parameter value, reduce speed control error and increase rigidity. Too small, easy to cause vibration and noise.				

No.	Name	Range of values	Default value	Unit	Apply
Pn157▲	Simulated speed, instruction smoothing, filtering time	1~500	1	0.1ms	S
	The larger the set value, the slower the input analog response speed is, which is beneficial to reduce the high-frequency noise interference. The smaller the set, the faster the response rate, but the interference noise will become larger.				
No.	Name	Range of values	Default value	Unit	Apply
	Analog speed command gain	1~1500	300	r/min /V	S
	The proportional relationship between analog speed, command input and actual				

Pn158	motor speed. Voltage input range -10~10V. Formula: speed = input voltage *Pn158. For example, when the input voltage is 10V, if it is set to 300, the corresponding speed is 10*300=3000r/min.  Rated speed Speed voltage command

No.	Name	Range of values	Default value	Unit	Apply
Pn159	Analog speed shift adjustment	-5000~5000	0	mv	S

• The analog input may have an offset that can be compensated by this parameter.



• Automatically adjust the offset to perform Fn008 operations.

• Manually adjust the offset step as follows:

1: the external 0 potential access analog input port

2: set this parameter to 0 and observe the value displayed by the dn17 in the monitor mode.

3: if the observation value is not 0, input negative observation value to this parameter, then can realize the adjustment (pay attention to voltage unit conversion relation).

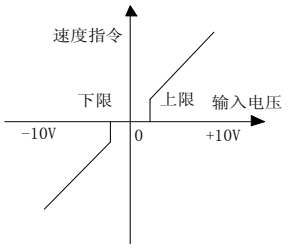
Example: dn17=1.12V, Pn159, enter -1120mv.

No.	Name	Range of values	Default value	Unit	Apply
Pn160	Analog speed direction	0-1	0		S

Setting value	Function
0	Positive voltage forward (CCW), negative voltage reversal (CW)
1	Negative voltage forward (CCW), positive voltage inversion (CW)

No.	Name	Range of values	Default value	Unit	Apply
Pn161	Analog speed command force zero interval upper limit	0~1000	0	10mv	S
Pn162	Analog speed command forced zero interval lower bound	-1000~0	0	10mv	S

• When the input speed command is between the lower limit and the upper limit, the input command is forced to 0 V.



• At this point the input voltage is the input voltage adjusted by the PN159 offset.

• Through the setting of the upper and lower limits, the input instructions can be changed into unipolar and bipolar instructions. Example: an upper limit of 0, a lower limit of -1000, equivalent to the input instruction range of 0~10V, for the positive speed command.

No.	Name	Range of values	Default value	Unit	Apply

Pn163	Zero speed clamping lock mode	0-1	0		S
	• 0: when locking, clamping mode is the position loop control, the intervention of the internal loop control, through the Pn167 set gain. • 1: when locking, clamping method is speed loop control, speed command is 0, the position may be changed because of external force.				

No.	Name	Range of values	Default value	Unit	Apply
Pn164	Zero speed clamping trigger mode	0~1	0		S

Setting value	function
0	SigIn port ZeroLocK is ON.
1	The speed command is triggered when it is lower than the Pn165 parameter

No.	Name	Range of values	Default value	Unit	Apply
Pn165	Zero speed clamping level	0~200	6	r/min	S
	The motor shaft is locked when the Pn164 is set to 1 and the speed command is lower than the parameter value. Example: this parameter is set to 10r/min. If the analog speed command is in the range of -10r/min~10r/min, the deceleration clamp is used to prevent the analog speed command from drifting near zero, resulting in the instability of the motor shaft.				

No.	Name	Range of values	Default value	Unit	Apply
Pn166	Zero speed clamping deceleration time	5~10000	50	ms	S
	After the zero speed clamp is triggered, decelerate immediately to zero at the deceleration time and then lock.				

No.	Name	Range of values	Default value	Unit	Apply
Pn167	Internal position regulator gain	1-2000	100	1/S	All

No.	Name	Range of values	Default value	Unit	Apply
Pn168	Speed command source selection	0~2	0		S
	Optional optional speed command source in speed control mode:				

setting value	Fnction
0	External analog speed command + internal speed 2~8
1	Internal speed 1 ~8
2	Motion controller analog voltage command

No.	Name	Range of values	Default value	Unit	Apply
Pn169	Internal speed command 1	-5000-5000	0	R/min	S
Pn170	Internal speed command 2	-5000-5000	0	R/min	S
Pn171	Internal speed command 3	-5000-5000	0	R/min	S
Pn172	Internal speed command 4	-5000-5000	0	R/min	S
Pn173	Internal speed command 5	-5000-5000	0	R/min	S
Pn174	Internal speed command 6	-5000-5000	0	R/min	S
Pn175	Internal speed command 7	-5000-5000	0	R/min	S
Pn176	Internal speed command 8	-5000-5000	0	R/min	S

When the drive control mode is in the speed control mode, the source of the speed command is determined by SP1, SP2, SP3 of the input port SigIn:

SP3	SP2	SP1	Speed command
0	0	0	Internal speed 1/ external analog speed command (determined by Pn168)
0	0	1	Internal speed 2
0	1	0	Internal speed 3
0	1	1	Internal speed 4
1	0	0	Internal speed 5
1	0	1	Internal speed 6
1	1	0	Internal speed 7
1	1	1	Internal speed 8

Note 1:0 indicates OFF, and 1 stands for ON.

Note 2: if the SigIn port does not specify SP3, SP2, and SP1 functions, the default is the OFF state.

No.	Name	Range of values	Default value	Unit	Apply
Pn177	JOG speed	0~5000	200	r/min	S
Pn178◆	JOG Acceleration time	5~ 10000	100	ms	S
Pn179◆	JOG Deceleration time	5~ 10000	100	ms	S
	When inching test run, the speed of motor operation and the time of acceleration and deceleration can be set.				

No.	Name	Range of values	Default value	Unit	Apply
Pn182	Speed loop PDFF control factor	0~100	100	-	PS
	This parameter determines the control structure of the speed loop. Pn182=100, for the PI control structure; Pn182=0, for the I-P control.				

No.	Name	Range of values	Default value	Unit	Apply
Pn183~	Speed feedback compensation	0~100	0	%	PS
	The feedback speed is compensated, and the greater the compensation value is, the more noise the motor will make.				

4.3.4 Torque control parameter

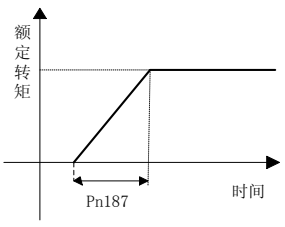
No.	Name	Range of values	Default value	Unit	Apply
Pn186	Torque command acceleration and deceleration mode	0~1	0		T

Setting value	Function
0	Do not use torque command to speed up and down
1	Using torque command, linear acceleration and deceleration

No.	Name	Range of values	Default value	Unit	Apply
Pn187▲	Torque command linear acceleration and deceleration time constant	1~30000	1	ms	T

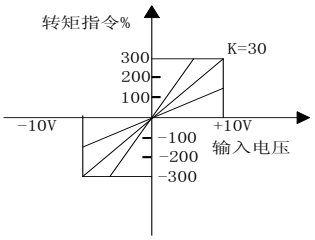
The time constant is defined as the time that the torque command rises from zero straight to the nominal torque.

Rated torque



time

No.	Name	Range of values	Default value	Unit	Apply
Pn188▲	Simulated torque command smoothing filtering time	1~500	5	0.1ms	T
	The larger the set value, the slower the input analog response speed is, which is beneficial to reduce the high-frequency noise interference. The smaller the set, the faster the response rate, but the interference noise will become larger.				

No.	Name	Range of values	Default value	Unit	Apply
Pn189	Analog torque command gain	1-300	30	%/V	T
	The proportional relationship between the analog torque command input and the actual output torque of the motor. Voltage input range -10~10V. The default input voltage is 10V, and the motor reaches 3 times the rated torque, i.e., Y=KX=30X, K=30. Torque command  input voltage				

No.	Name	Range of values	Default value	Unit	Apply
Pn190	Analog torque command offset adjustment	-1500~1500	0	mv	T
	Adjustment mode reference "analog speed command offset adjustment"				

No.	Name	Range of values	Default value	Unit	Apply

Pn191	Analog torque direction	0-1	0		T

Setting value	Function
0	Positive voltage forward (CCW), negative voltage reversal (CW)
1	Negative voltage forward (CCW), positive voltage inversion (CW)

No.	Name	Range of values	Default value	Unit	Apply
Pn192	Torque Q shaft regulator proportional gain 1	5~ 2000	100	%	All
Pn193	Torque Q axis regulator integration time constant 1	5~ 2000	100	%	All
Pn194	Torque Q shaft regulator proportional gain 2	5~ 2000	100	%	All
Pn195	Torque Q axis regulator integration time constant 2	5~ 2000	100	%	All
	• Increasing the proportional gain can speed up the Q axis current response. • Reducing the integral time constant can reduce the Q axis current control error.				

No.	Name	Range of values	Default value	Unit	Apply
Pn196	Torque instruction filtering time constant 1	1~5000	40	0.01ms	All
Pn197	Torque instruction filtering time constant 2	1~5000	40	0.01ms	All
	The mechanical vibration can be suppressed, the greater the set value, the better the effect, resulting in slower response to the meeting, may cause oscillation; the smaller the set value, the faster the response, but limited by mechanical conditions.				

No.	Name	Range of values	Default value	Unit	Apply
Pn198	Limiting speed during torque control	0~4500	2500	r/min	T

	In torque control, the motor speed is limited within this parameter range. It can prevent overspeed during light load. When speeding occurs, the intervention speed control reduces the actual torque, but the actual speed will be slightly error.

No.	Name	Range of values	Default value	Unit	Apply
Pn199	Torque control, limited speed, source selection	0~2	0		T

Setting value	Function
0	Subject to parameter Pn198 limit.
1	Subject to the internal speed command 1~8 limit.
2	If Pn204=1, that is, all torque commands originate from the internal torque command, the speed can be limited by analog voltage, speed, and instruction.

• All of these speed limits are positive and negative, and multiple speed limits occur, subject to minimal speed.

SP3	SP2	SP1	Speed command
0	0	0	Internal speed 1
0	0	1	Internal speed 2
0	1	0	Internal speed 3
0	1	1	Internal speed 4
1	0	0	Internal speed 5
1	0	1	Internal speed 6
1	1	0	Internal speed 7

1	1	1	Internal speed 8	

• If this parameter is set to 1 and limited by the internal speed command, the Sp1, SP2, and SP3 determine the limited speed value:

0 stands for OFF, and 1 means ON.

• Even if the parameter settings exceed the maximum speed allowed by the system, the actual speed will be limited to the maximum speed.

No.	Name	Range of values	Default value	Unit	Apply
Pn200	Internal torque 1	-300~300	0	%	T
Pn201	Internal torque 2	-300~300	0	%	T
Pn202	Internal torque 3	-300~300	0	%	T
Pn203	Internal torque 4	-300~300	0	%	T

When selecting the internal torque control mode, the TR1 TR2 using the input port SigIn can select 4 torque commands:

TR2	TR1	Torque command
0	0	Internal torque 1 or external analog torque instruction (determined by Pn204)
0	1	Internal torque 2
1	0	Internal torque 3
1	1	Internal torque 4

Note 1:0 indicates OFF, and 1 stands for ON

Note 2: if the SigIn port does not use the specified TR2, TR1 function, the default is the OFF state.

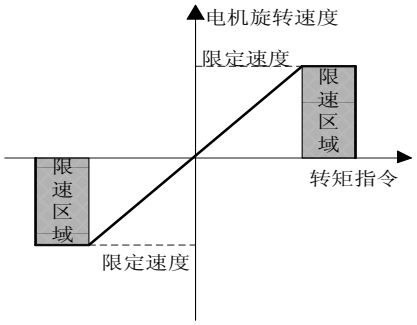
No.	Name	Range of values	Default value	Unit	Apply
	Torque command source	0~2	0		T

Setting value	Function
0	External analog torque command.

Pn204	1	Internal torque 1.
	2	Motion controller analog voltage command.

No.	Name	Range of values	Default value	Unit	Apply
Pn205	Torque D axis regulator; proportional gain	5~2000	100	%	All
Pn206	Torque D axis regulator, integral time constant	5~2000	100	%	All
	In space vector modulation, the proportional gain and integral time constant of the regulator of the torque D axis.				

No.	Name	Range of values	Default value	Unit	Apply
Pn207	Speed feedback adjustment factor	1~3000	100		T
	In torque control, the motor speed is outside the defined speed range, and the intervention speed feedback is applied to reduce the actual torque, so that the speed is returned to the limited speed range. Parameter setting is smaller, the greater the amount of feedback, adjust more quickly, the difference with the speed limit is small, but too small may cause motor jitter; parameter setting is too large, adjust more slowly, there may have been no limiting speed. The actual speed will be slightly higher than the specified speed.				

No.	Name	Range of values	Default value	Unit	Apply
Pn208	1Tracking torque instruction to determine range of error 1	0~300	5	%	T
Pn209	2Tracking torque instruction to determine range of error 2	0~300	2	%	T
	To make the SigOut port TCMDreach signal output valid, the following conditions must be met: Condition 1: the torque instructions set by the upper computer must be within 1 of the error range. Example: the input torque command 80%, Pn208 is set to 5%, the driver of the internal torque input speed plus and deceleration operations, when the output torque calculation instructions in the 75%~85% range, the condition 1 is met. Condition 2: the difference between the actual motor torque and the input torque command is within 2 of the error range.				

No.	Name	Range of values	Default value	Unit	Apply
Pn210	Decision time for speed limited output	0~2000	15	ms	T
	In the torque control mode, when the motor speed exceeds the maximum speed limit value and the speed limiting function is continued within the decision time, the SPL function signal of the SigOut port is output ON to reduce the frequent inversion of the signal.				

4.3.5 Extended control parameter

No.	Name	Range of values	Default value	Unit	Apply
Pn216▲	Absolute encoder usage selection	0~1	1		All

Setting value	Function
0	Single loop absolute encoder
1	Multi loop absolute encoder
2	Motion controller analog voltage command.

When there is no external battery, the encoder cannot save multi circle information. This parameter should be set to 0.

No.	Name	Range of values	Default value	Unit	Apply
Pn217	Absolute encoder output line	16~16384	2500	line	All

• A pulse transmitted from the outside of the servo unit. The higher the output line, the higher the maximum frequency (Max=1.6Mhz) of the A and B orthogonal pulse signals, and the higher the requirements for the pulse receiver circuit of the host computer. A poor reception circuit will suffer from pulse missing.

• By default, Pn217=2500, that is, the motor rotates one turn, the servo unit outputs 2500*4=10000 pulses.

No.	Name	Range of values	Default value	Unit	Apply
	Absolute position data transfer mode for absolute encoder	0~1	0		All

Pn218	When Pn216 is set to 1, that the use of multi ring absolute encoder data, and the absolute encoder is equipped with batteries, multi turn absolute position information at this time will output the correct; if Pn216 is set to 0, the output of the multi ring position information for 0. See the use of absolute servo units in chapter tenth".

Setting value	Function
0	The incremental mode outputs the absolute position information of the circle and the absolute position information of the single circle
1	Digital encoding outputs absolute position information and single loop absolute position information

No.	Name	Range of values	Default value	Unit	Apply
Pn219	Multi turn overflow detection for absolute encoder	0~1	1		All
	When used as a multi loop absolute encoder, if the motor is always running in single direction, it may lead to multi circle data overflow. This parameter can be set to turn off the overflow alarm.				

Setting value	Function
0	Multi circle overflow alarm not detected
1	Multi circle overflow alarm detection

No.	Name	Range of values	Default value	Unit	Apply
Pn234	Maximum pulse command frequency	20~2000	550	KHZ	P
	When the instruction pulse frequency exceeds the set value, the driver sends out an alarm.				

No.	Name	Range of values	Default value	Unit	Apply
Pn235	Pulse instruction digital filtering time	0~255	0	100ns	P
	• The input instruction pulse is filtered digitally to filter the noise on the signal line. • The greater the setup time, the lower the maximum pulse frequency. System defaults, allowing maximum 550KH frequencies to be received. Filter time must be left a certain margin, otherwise there may be lost pulse phenomenon.				

No.	Name	Range of values	Default value	Unit	Apply
Pn236	Absolute encoder, forward soft forbidden, multi circle value	0~32000	0	-circle	All
Pn237	Absolute encoder, forward soft forbidden, single coil value	0~10000	0	0.0001circle	All
Pn238	Absolute encoder, reverse soft forbidden, multi circle value	0~32000	0	circle	All
Pn239	Absolute encoder, reverse soft inhibit, single coil value	0~10000	0	0.0001circle	All
	• For servo motors with absolute encoders, use the encoder's multi turn function (Pn216=1) and use software driver disable function. The soft disable function is equivalent to a drive disable function triggered by an external port (CCWL, CWL) that can be used in conjunction with the P007 and Pn077 parameters. • When the parameter is set to 0 (default), the soft disable function is invalid. Otherwise, when the number of turns of the motor reaches the set value, the soft disable function will be triggered. Example: Pn236=100, Pn237=5000, triggers the drive disable function when the motor is rotated forward beyond the 100+5000*0.0001=100.5 loop.				

No.	Name	Range of values	Default value	Unit	Apply
Pn257	Load inertia ratio	0~100.00	1.00	times	PS
	Load torque ratio = (JL of motor shaft translation) (/ rotor inertia (Jm)). When leaving the factory, the servo motor is assumed to have a double load inertia state.				

No.	Name	Range of	Default	Unit	Apply

		values	value		
Pn258	Gain adjustment mode	0~1	0	-	PS

Setting value	Function
0	Manual gain adjustment.
1	For automatic gain adjustment, see the chapter on "operation and adjustment".

No.	Name	Range of values	Default value	Unit	Apply
Pn259	Rigid grade selection	0~20	5	-	PS
	The higher the rigidity, the faster the servo response, but the higher rigidity will cause the motor vibration. The method of setting is detailed in the chapter "operation and adjustment".				

No.	Name	Range of values	Default value	Unit	Apply
Pn260	Real-time estimation method of inertia	0~1	0	-	All

Setting value	Function
0	Off-line inertia estimation. Identification of inertia by Fn018 operation.
1	On-line inertia estimation. When the motor is running, the real-time estimation is made and the load inertia ratio is checked by Dn030.

No.	Name	Range of values	Default value	Unit	Apply
Pn263◆	Inertia estimation acceleration and deceleration time	20~500	80	ms	All
Pn264◆	Inertia estimation allows maximum speed	150~1000	400	r/min	All

Pn265◆	Inertia estimation pause interval	0~10000	500	ms	All
Pn266◆	Inertia estimation; inertia ratio; prediction value	1.00~20.00	3.00	times	All
	See system reliability identification in chapter "operation and adjustment".				

No.	Name	Range of values	Default value	Unit	Apply
Pn267▲	Rated torque of motor	0~32000	0	0.1N.m	All
Pn268▲	Maximum output torque of motor	0~32000	0	0.1N.m	All
Pn269▲	Jm Motor rotor moment of inertia Jm	0~32000	0	Kg•M^2•10^-4	All
Pn270▲	Maximum motor speed	80~5500	80	r/min	All
	Must be set according to motor nameplate parameters. The wrong parameter setting will affect the motor performance, resulting in abnormal rotation of the motor. By default, drive the internal parameters of the drive.				

4.4 Port function detail

4.4.1 SigIn input port function detailed

NO.	Symbol	Function	Function description
0	NULL	Nonfunctional assignment	The drive does not generate any action on the input state.
1	Son	Servo enable	OFF: the drive doesn't work, the motor doesn't work. ON: driver enable, motor powered Note: the Pn003 parameter or the Son status is determined.
2	AlarmRst	Alarm reset	When the alarm is on, and when the alarm can be cleared, the input signal rising edge (OFF to ON) is used to clear the alarm.
3	CCWL	Forward drive inhibit	OFF: prohibits the motor going forward ON: allow the motor to turn Note 1: if you want to use the forward drive disable function, first set the Pn006 parameter, turn on the function, and then specify the specific input port. By default, this function is not used.

<table>
<tr><td></td><td></td><td></td><td>Note 2: when the motor is in normal operation, the CCWL must be in normally closed contact (ON state)
Note 3: this function is invalid when origin returns.</td></tr>
<tr><td>4</td><td>CWL</td><td>Reverse drive inhibit</td><td>OFF: prohibits motor inversion
ON: allow the motor to reverse</td></tr>
<tr><td>5</td><td>TCCW</td><td>External forward torque limit</td><td>OFF: CCW torque is not limited by the Pn010 parameter
ON: CCW direction torque is limited by the Pn010 parameter
Note: no matter whether TCCW is valid or invalid, the CCW direction torque is limited by the Pn008 parameter.</td></tr>
<tr><td>6</td><td>TCW</td><td>External reverse torque limit</td><td>OFF: CW torque is not limited by the Pn011 parameter
ON: CW direction torque is limited by the Pn011 parameter
Note: no matter whether TCW is valid or invalid, the CW direction torque is limited by the Pn009 parameter.</td></tr>
<tr><td>7</td><td>EMG</td><td>Emergency shutdown</td><td>OFF: prohibits drive drive motors, cutting motor currents
ON: allows drivers to drive motors normally</td></tr>
<tr><td>8</td><td>ZeroLock</td><td>Zero speed clamping</td><td>Speed control:
OFF: does not lock the motor shaft
ON : Lock the motor shaft</td></tr>
<tr><td>9</td><td>SP1</td><td>Internal speed command select 1</td><td rowspan="3">When the driver's control mode is in speed control mode, the source of speed instruction is determined by SP1, SP2 and SP3 of SigIn:
<table>
<tr><td>SP3</td><td>SP2</td><td>SP1</td><td>Speed command</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>nternal speed 1
external analog
Speed command (Pn168 selection)</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>Internal speed 2</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>Internal speed 3</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>Internal speed 4</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>Internal speed 5</td></tr>
</table></td></tr>
<tr><td>10</td><td>SP2</td><td>Internal speed command select 2</td></tr>
<tr><td>11</td><td>SP3</td><td>Internal speed command select 3</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>1</td><td>0</td><td>1</td><td>Internal speed 6</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>Internal speed 7</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>Internal speed 8</td></tr>
</table>
Note 1:0 indicates OFF, and 1 stands for ON.
Note 2: if the SigIn port does not specify SP3, SP2, and SP1 functions, the default is the OFF state.
</td></tr>
<tr><td>12</td><td>TR1</td><td>Internal torque command select 1</td><td rowspan="2">Select the internal torque control mode, the use of TR1, TR2 combination, you can select 4 torque commands.
<table>
<tr><th>TR2</th><th>TR1</th><th>Torque command</th></tr>
<tr><td>0</td><td>0</td><td>Internal torque 1/ external analog torque command (Pn204 selection)</td></tr>
<tr><td>0</td><td>1</td><td>Internal torque 2</td></tr>
<tr><td>1</td><td>0</td><td>Internal torque 3</td></tr>
<tr><td>1</td><td>1</td><td>Internal torque 4</td></tr>
</table>
Note 1:0 indicates OFF, and 1 stands for ON
Note 2: if the SigIn port does not use the specified TR2, TR1 function, the default is the OFF state.</td></tr>
<tr><td>13</td><td>TR2</td><td>Internal torque command select 2</td></tr>
<tr><td>14</td><td>Cmode</td><td>Control mode switching</td><td>When the parameter Pn002 is 3, 4, and 5, control mode switching can be carried out.</td></tr>
<tr><td>15</td><td>Cgain</td><td>Gain switching</td><td>When the parameter Pn045 is 2, the Cgain switches the gain combination:
OFF: first gain
ON: second gain</td></tr>
<tr><td>16</td><td>Gn1</td><td>Electronic gear molecule selection 1</td><td rowspan="2">1~4 Select the electronic gear molecule Gn2 through the combination of Gn1 and 1~4
<table>
<tr><th>Gn2</th><th>Gn1</th><th>Electronic gear ratio, molecular N</th></tr>
<tr><td>OFF</td><td>OFF</td><td>First molecule</td></tr>
<tr><td>OFF</td><td>ON</td><td>Second molecule</td></tr>
<tr><td>ON</td><td>OFF</td><td>Third molecule</td></tr>
<tr><td>ON</td><td>ON</td><td>Fourth molecule</td></tr>
</table></td></tr>
<tr><td>17</td><td>Gn2</td><td>Electronic gear molecule selection 2</td></tr>
<tr><td>18</td><td>CINV</td><td>Instruction fetch</td><td>In speed or torque control mode, the speed or torque is reversed.
OFF: normal instruction</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td>ON: instruction is reversed</td></tr>
<tr><td>19</td><td>Pclear</td><td>Clearance of position deviation</td><td>Clears the value of the position counter, and the clearing method is determined by the Pn108 parameter:<table><tr><td>Pn108</td><td>mode</td></tr><tr><td>0</td><td>Pclear Level ON period</td></tr><tr><td>1</td><td>Pclear rising edge time (from OFF to ON)</td></tr></table></td></tr>
<tr><td>20</td><td>INH</td><td>Pulse input inhibit</td><td>OFF:The input command pulse is valid
ON: the input command pulse is invalid and ignored</td></tr>
<tr><td>21</td><td>PC</td><td>Proportional control</td><td>The speed loop is the PI control structure (Pn182=100):
OFF: speed loop PI control
ON: speed loop P control</td></tr>
<tr><td>22</td><td>GOH</td><td>Origin regression trigger</td><td rowspan="2">See Appendix F for details</td></tr>
<tr><td>23</td><td>REF</td><td>Origin regression reference point</td></tr>
<tr><td>24</td><td>Pos1</td><td>Internal location selection pos1</td><td rowspan="4">See Appendix G for details</td></tr>
<tr><td>25</td><td>Pos2</td><td>Internal location selection pos2</td></tr>
<tr><td>26</td><td>ptriger</td><td>Trigger internal position command</td></tr>
<tr><td>27</td><td>pstop</td><td>Pause internal position command</td></tr>
<tr><td>28</td><td>Psource</td><td>Internal and external position instruction selection</td><td>At Pn117=2, the source of the pulse command is determined by the Psource:
OFF: external location command
ON: Internal position command</td></tr>
<tr><td>29</td><td>Pdistance</td><td>Fixed length displacement interrupt</td><td>When SigIn:Pdistance is changed from On to Off, the drive will perform a fixed length function, as shown in Appendix H</td></tr>
<tr><td>30</td><td>Punlock</td><td>Fixed length unlock</td><td>At Pn139=1, the servo is in a fixed length lock state after a long distance, and the drive can respond to the</td></tr>
</table>

			position instructions only when the sigIn:Punlock is longer than Off from the On. See Appendix H for details
31	Sen	Absolute location requestAbsolute location request	For absolute position information of absolute encoder for upper computer, see the use of absolute servo unit in the tenth chapter″

4.4.2 SigOut output port function detailed

NO.	Symbol	Function	Function description
0	null	Nonfunctional assignment	
1	Alarm	Alarm detection	OFF: alarm ON: No alarm
2	Ready	Servo ready	OFF: has alarm or a fault ON: no alarm and fault
3	Emg	Emergency stop detection	OFF: Not in an emergency stop ON: in an emergency stop
4	Preach	Location complete	Position control mode OFF: position deviation is greater than the value set by the parameter Pn104 ON: position deviation is less than the value set by the parameter Pn104
5	Sreach	Speed arrival	OFF: speed is less than the value set by Pn021 ON: the speed is greater than or equal to the value set by Pn021
6	Treach	Arrival torque	OFF: torque less than Pn024 setting value ON: torque greater than or equal to the value set by Pn024
7	ZeroSpeed	Zero speed	OFF: speed is greater than the value set by Pn027 ON: the speed is less than or equal to the value set by Pn027
8	Run	Servo motor energized	OFF: motor is not energized ON: motors are energized
9	BRK	Electromagnetic braking	OFF: electromagnetic brake ON: electromagnetic brake release

10	HOME	Origin regression complete	See Appendix F for details
11	Pnear	Positioning approach	In position control OFF: position deviation is greater than the value set by the parameter Pn106 ON: position deviation is less than the value set by the parameter Pn106
12	TRQL	Torque limit	OFF: motor torque is not limited ON: motor torque is limited When the torque command reaches the minimum parameter value in Pn008, Pn009, Pn010, and Pn011, the TRQL is ON.
13	SPL	Speed limit	Torque control OFF: motor speed is not up to the limit ON: motor speed has reached the limit value See Pn198, Pn199 for instructions
14	TCMDreach	Tracking torque command arrives	At torque control: OFF: the motor torque does not reach the torque command value set by the upper computer ON: the motor torque reaches the set torque command value set by the upper computer, See the Pn208 and Pn209 instructions

The fifth chapter monitoring parameters and operation

5.1 Monitor panel operation

See the "monitor mode" operation in chapter third".

5.2 List of monitoring parameters

NO.	Explain
dn-00	Monitor display options (default for motor speed) by setting the Pn079 parameter so that the dn-00 displays different monitoring states.
dn-01	Speed command (unit: r/min)
dn-02	Average torque (unit:%)
dn-03	Position deviation (-9999~9999) (unit: bit)
dn-04	AC power supply voltage (unit: volt)
dn-05	Maximum instantaneous torque (unit:%)
dn-06	Pulse input frequency (unit: KHZ)
dn-07	Temperature of radiator (unit: Celsius)
dn-08	Current motor speed (unit: r/min)
dn-09	Effective input instruction pulse accumulated value low (-9999~ 9999) (unit: bit)
dn-10	Effective input instruction pulse accumulated value high (-5000~5000) (unit: 10000bit) (pulse accumulation value is higher than + 5000, then high position 0, low bit unchanged, count again)
dn-11	In position control, the effective feedback pulse accumulated value of encoder is low (-9999~9999) (unit: bit)
dn-12	Position control, the encoder effective feedback pulse accumulation value high (-5000~5000) (unit: 10000) (feedback pulse accumulation value is higher than + 5000, then high position 0, low bit unchanged, re count)
dn-13	Regenerative braking load rate
dn-14	The input port signal status, from left to right, is SigIn1~SigIn10 (the upper half of the digital tube is bright: high level, lower half is bright: low level)
dn-15	The output port signal status, from left to right, is SigOut1~SigOut5 (the upper half of the digital tube is bright: high level, lower half is bright: low level)

dn-16	When the motor is enabled, the analog torque is indicated by voltage (unit: volts)
dn-17	When the motor is enabled, the analog speed is indicated by voltage (unit: volts)
dn-18	Output function status register
dn-19	After the servo is powered on, the feedback pulse value of the motor is low (-9999~9999) (unit: bit)
dn-20	After the servo power, the motor feedback pulse accumulation value is high (-5000~5000) (unit: 10000bit) (the feedback pulse accumulation value is higher than + 5000, then high position 0, low position unchanged, count again)
dn-21	Drive software version
dn-22	The encoder UVW signals, from left to right, are the level states of the UVW signal (1: high level, 0: low level) (incremental encoder)
dn-23	Absolute position of rotor (incremental encoder)
dn-24	Driver type
dn-25	Absolute value encoder, single loop data low (0~9999) (unit: bit)
dn-26	Absolute encoder, single loop data high bit (0~9999) (unit: 10000bit)
dn-27	Absolute value encoder, multi circle data low bit (-9999~9999) (unit: circle)
dn-28	Absolute value encoder, multi loop data high bit (-9999~9999) (unit: ten thousands circle)
dn-30	Load inertia ratio

Note: the Dn-18 outputs the functional status register, i.e., the functional logic status of the SigOut port, as shown in the table below for each Bit bit:

Bit	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
function	Run	ZeroSpeed	Treach	Sreach	Preach	Emg	Ready	Alarm
Bit	Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
function	-	-	TCMDreach	SPL	TRQL	Pnear	HOME	BRK

The Bit bit is 0, which means that the function is ON, and the 1 is the OFF state.

The sixth chapter, alarm and treatment

6.1 Alarm clearing operation

See the "alarm clearing" operation of the auxiliary mode operation in chapter third".

6.2 Alert content and Countermeasures

Alarm display	Cleanup mode	Abnormal alarm declaration	Removal method
AL-01	Power up again	Memory contents corrupted or memory chip corrupted	1： initialization of the parameters, observe the situation. 2： through the Modbus communication mode and the button operation mode, edit the operation of the parameter simultaneously, which may lead to the mistake of the check code and cause the alarm. 2: internal chip damage, replace servo amplifier.
AL-02	Reset	An alarm that occurs when the DC bus voltage is below 200V when the low voltage alarm is not turned on.	1： use voltmeter to measure whether the external power supply voltage meets the specifications. If the specifications are met, the bus voltage correction can be carried out using the auxiliary mode Fn009. 2： through the display panel, enter the monitoring mode, observe whether the voltage is consistent with the external voltage, if the difference is too large, then the internal components damaged, replace servo amplifier. 3： the motor load is large, the starting speed is too fast, leading to the internal bus voltage is low. If it is a single-phase power supply, please use three-phase power supply.
AL-03	Power up again	The internal DC bus voltage is too high	1: use voltmeter to measure whether the external power supply voltage meets the specifications. If the specifications are met, the bus voltage correction can be carried out using the auxiliary mode Fn009. 2： through the display panel, enter the monitoring mode, observe whether the voltage is consistent with the external voltage, if the difference is too large, then the internal components damaged, replace servo amplifier. 3: within a reasonable range, appropriate deceleration of small load inertia or extended

			acceleration and deceleration time, or need additional brake resistance.
AL-04	Power up again	Intelligent power module generates alarms directly	1: check the motor power line U, V, W whether the interphase short circuit or ground short circuit, and encoder line is normal connection. 2: heat sink high temperature, turn off the power, 30 seconds after the re power, and if the alarm still appears, the internal power module may be damaged, please replace the servo amplifier. 3: speed loop and current loop proportional integral parameter are not set properly.
AL-05	Reset	Overload 1	In the Pn014 parameter setting, the current is continuously greater than the overload power parameter Pn012 or the set multiple of the Pn013. 1: check the motor line U, V, W and encoder line is normal. 2: The acceleration and deceleration frequency of the motor is too high to prolong the acceleration and deceleration time, reduce the load inertia or change the servo motor with greater power capacity.
AL-06	Power up again	Overload 2	The Pn015 parameter is set to 3 times longer than the rated load during the set time. The method of elimination referred to overload 1. Note: some motors can only withstand 2.5 or 2 times the rated load, but not 3 times as the calculation.
AL-07	Reset	Motor speed is too high	1: Check whether the motor line U, V, W and encoder line are normal. 2: Reduce the pulse frequency of input instructions or adjust the electronic gear ratio. 3: The proportional integral parameters of the speed ring are adjusted improperly and re-adjusted.
AL-08	Reset	The servo amplifier heatsink is overheated and the actual temperature has	1: repeated overload can cause overheating of the drive. Please change the way the motor works. To extend the service life of the server, it should be used at ambient temperature below 60 degrees, and

		exceeded the Pn084 setpoint	the recommended temperature is not more than 50 degrees celsius. 2: braking average power overload.
AL-09	Power up again	Encoder exception	1: check whether the motor encoder connection is connected to the driver. 2: check whether the motor encoder interface weld, short-circuit or fall off, the encoder power line is connected properly. 3: check the encoder power supply voltage (5V + 5%). (the encoder line needs to be paid special attention when it is longer)
AL-10	Reset	The actual received pulse frequency is too high to exceed the Pn234 setpoint	1: reduces the pulse frequency of the input command
AL-11	Reset	The position pulse deviation is greater than the setpoint	1: check the motor line U, V, W and encoder line is normal. 2 :position instruction smoothing time constant is set too large. 3: increases the position loop gain to speed up the motor response. 4: use monitoring mode to see if the motor output torque is up to its limit. 5: internal 32 bit pulse counter overflow.
AL-12	Reset	The current sampling loop may be damaged.	1: instantaneous current is too large to exceed detectable range. 2: check the motor line (U, V, W) whether it is loose, falling or short connection to the ground. 3: sampling loop corrupted, replace servo amplifier.
AL-13	Power up again	CPU internal fault	1: external interference is too large to reduce interference. 2:CPU chip corrupted, replace servo amplifier.
AL-14	Reset	Emergency stop signal is	See if the port has an emergency stop function and

		valid	whether the signal contact is in a normally closed state (ON)
AL-15	Reset	forbidden exception, Ccwl or Cwl as OFF state	1: check CCWL, CWL wiring, signal contact is in normally closed state (ON). 2: if you do not use the drive disable function, you can set the pn006 parameter to mask it.
AL-16	Reset	The input voltage is too high or the braking load rate is above 85%	1: uses monitor mode to see if the input voltage is beyond normal range 2: reduces start stop frequency 3: external regenerative braking resistor (remove internal braking resistor, not parallel) 4: increases deceleration time 5:Are the power and resistance values of the regenerative resistors set correctly? 6: replace more power motors and drives
AL-17	Power up again	Improper encoder output frequency division.	To reset the Pn016, the Pn017 parameter value must satisfy DA/DB>=1.
AL-18	Power up again	The current driver model does not support the set motor type	Refer to the drive and motor model adapter to reset the Pn001.
AL-19	Reset	Power module overheating	The temperature of the power module is too high and the heating is serious. It needs to be cooled for a period of time. Otherwise, the service life of the module will be reduced.
AL-20	Power up again	The same function is assigned to multiple input ports	View all SigIn ports and remove duplicate ports.
AL-21	Power up again	Memory contents are completely destroyed	1: initializes the parameters and looks at the situation. If alarm occurs again frequently, replace servo amplifier. 2: internal chip damage, replace servo amplifier.
AL-22	Power up again	Watchdog timer overflow	1: power on again. Replace the servo amplifier if it occurs again and again. 2: external interference is too large to reduce external interference.

AL-23	Power up again	Current zero drift compensation anomaly	1: re power, if repeated, the current sampling loop components may be damaged.
AL-24	Power up again	Programmable logic chip exception	1: power on again. Replace the servo amplifier if it occurs again and again. 2: external interference is too large to reduce external interference.
AL-25	Power up again	DSP chip abnormalities	Power up again. Replace the servo amplifier if it occurs again and again..
AL-26	Power up again	Unsupported origin regression combination	Refer to appendix F, reset Pn034, Pn035.
AL-27	Power up again	The external braking resistance is less than the drive type, allowing minimum resistance.	Replace the external brake resistor.
AL-28	Power up again	The regenerative rate of the braking resistor is more than the Pn090 setting, and the resistance surface has a higher temperature rise. Must be resistance to cooling for more than 15 minutes, then power, or short-term continuous re power work, may lead to the resistance to burn, causing fire.	1 enter the Dn013 and check the brake electric regenerative load rate.
AL-29	Power up again	Servo short duration brake abnormal	1 enter the Dn004 to see if the input voltage is too high. 2 wiring off or no braking resistance
AL-31	Power up again	Absolute encoder battery low voltage warning	The battery voltage is less than 3.1 + 0.1V. Please replace the battery immediately, otherwise you will lose multi circle data.
AL-32	Power up	Absolute encoder battery	A case where the battery voltage is below 2.5 + 0.2V

	again	voltage is too low	has occurred. Check if the battery is loose and the battery voltage is normal. Please perform the Fn015 operation and reset the multi circle information to relieve the alarm.
AL-33	Power up again	Absolute encoder multi turn count overflow	During servo or power off, the multi loop counter counts beyond the count boundary. Perform the Fn015 operation to reset the multi loop information. If there is no need for multiple loop overflow detection in the actual application, the Pn219 parameter can be set to turn off the multi ring overflow alarm.
AL-34	Power up again	Absolute encoder count error	During the power up, the motor speed is too high. Power up again, please.
AL-35	Power up again	Absolute encoder power error	When the encoder is powered on, the motor rotates and the speed is higher than 100r/min. When power is on, the motor must be in a stationary or low speed state.
AL-36	Power up again	Absolute encoder multi turn error	Error occurred in multi circle count. Perform the Fn015 operation to reset the multi loop information.
AL-37	Power up again	Motor overheating	1 motor temperature over 110 degrees, please cool for some time. 2 motor over use, please use a larger capacity of the motor
AL-38	Power up again	Absolute encoder detects excessive speed alarm	No battery or battery voltage is too low, the battery is normal and the drive does not receive the power supply, the motor rotates due to external acceleration. Please check the battery, and then perform the Fn015 operation to reset the multi loop information.
AL-41	Power up again	Communication fault, absolute encoder without response	1: check whether the motor encoder connector is connected to the drive. 2: check whether the motor encoder interface weld, short circuit or off; encoder signal wire sequence whether the power line is connected properly; encoder.

			3: encoder damage.
AL-42	Power up again	Absolute encoder communication, the number of errors in succession too much	1: check the motor, encoder, connector is bad contact, encoder line is too long. 2: check the encoder cable wiring, as far as possible to avoid with the motor line, power line and other strong interference source winding, should keep a considerable distance. 3: encoder interface circuit fault 4: too much external interference, reduce external interference
AL-43	Power up again	Absolute encoder internal storage unit data error	The storage cell is uninitialized or the data has been corrupted. Please perform the Fn017 operation and re initialize the data.
AL-44	Power up again	Absolute encoder frequency divider circuit fault	Encoder abnormal or motor running too fast
AL-45	Power up again	Reset, absolute encoder, multi turn error operation, error	Refer to AL-42 handling measures
AL-46	Power up again	Reset absolute encoder single turn error operation error	Refer to AL-42 handling measures

6.3 Other fault phenomena and treatment measures

In case the servo driver does not give an alarm, the failure conditions and treatment measures are as follows. If you still can not eliminate the abnormal situation after treatment, please contact our technical staff.

Fault phenomenon	Reason	Inspection methods and treatment measures
	The control power is not connected	Check the voltage between the terminals of the control power
	The main circuit power is not connected	Check the voltage between the main power terminals
	Control line (CN2 connector) wiring error or fall off	Check the installation and wiring of the CN2 connector
	The servo enable (SON) input is in the	Check that the input pin is falling off

The servo motor doesn't start running	OFF state	or connected to the wrong position. Check the port input status displayed by Dn014; You can also set the drive internal enable (Pn003=1) directly
	The torque, speed, or position of the input is too small to be zero or zero	Check whether the input pins fall off or connect wrong; increase the input command; torque, speed or position, command source selection, parameter settings inconsistent with expectations
	The pulse command issued by the host computer does not respond to the driver	Check the input pin is off, whether the terminal sequence of insanity; see Dn006, accept the same frequency and pulse frequency is from the upper PC; check the motor is working in position mode and be enabled; check whether the SigIn port specified by Pclear and INH, and the signal of the state is valid
	Error specifying the input port function number	Check that the SigIn port function parameter is set correctly
	System load is too large	Perform no-load JOG test to see if the drive is running properly
	Offset pulse clearing (Pclear) keeps the ON state	Check the Pclear input signal, port, and wiring to see the port status of the Dn014 display
	Forward drive, inhibit (CCWL), reverse drive, inhibit (CWL) input signal, maintain OFF status	Check the CCWL, CWL input signals, ports, and wiring to see the port status of the Dn014 display
	Motor power line (UVW) wiring error	Check power line connection order is correct
	Servo driver fault	The driver's internal wiring board fault must be repaired
	Torque limit valid	Internal or external torque limit values (Pn008~Pn011) are valid and limited values are too small
	The instruction pulse frequency is too low	The instruction pulse input frequency pulse input is not correct, see the Dn007 display; electronic gear ratio (Pn098~Pn112) molecular denominator of

		the ratio is too small; the instruction pulse input (Pn096) pulse emitted and PC does not match the connection order is wrong
	The speed control is in the zero speed clamping state	The SigIn:zero_Lock signal is the On state; at the zero speed clamping level (Pn165) range;
The servo motor stops running after an instant operation	Wiring fault of motor line	Check motor power line connection order is correct
	Wiring fault of motor line	Check the encoder wiring order is correct

The seventh chapter is Modbus serial communication

7.1 Introduction to Modbus Communications

The driver has the RS-232 and RS-485 communication interface, and the user can select an interface to communicate with the driver. The communication method uses the Modbus transfer protocol, and the following communication modes can be used: ASCII (AmericanStandard Code for information interchange) mode and RTU (Remote Terminal Unit) mode (). Before communication, you must first set up communication related parameters (Pn064~Pn071).

7.1.2 Coding meaning

ASCII mode:

Each 8-bit data consists of two ASCII characters. For example, a 1-byte data 78H (sixteen decimal notation) is represented by the ASCII code, which contains the '7' ASCII code (37H) and the '8' ASCII code (38H).

ASCII numbers from 0 to 9, letters A through F, as follows:

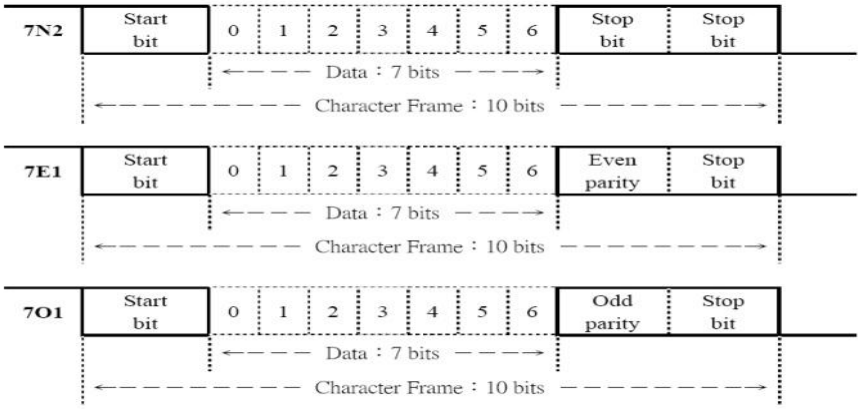
Character symbol	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'
Corresponding ASCII code	30H	31H	32H	33H	34H	35H	36H	37H
Character symbol	'8'	'9'	'A'	'B'	'C'	'D'	'E'	'F'
Corresponding ASCII code	38H	39H	41H	42H	43H	44H	45H	46H

RTU mode:

Each 8-bit data consists of two 4-bit sixteen hexadecimal data, that is, the general number of sixteen components. For example, the decimal 120 is represented by the 1-byte data of RTU as 78 H.

7.1.3 data structure

10bit character mode (for 7bit data)



11bit character mode (for 8bit data)

7.2 Communication protocol architecture

●ASCII mode

Name	Meaning	instruction
Start	Communication begins	Starting character ':' (ASCII:, 3AH)
Address	Communication address	Communication address, that is the site number of the drive. For example: a drive site number is 32, sixteen hexadecimal is 20H, Address = '2', '0', that is' 2 '=32H,' 0 '=30H
CMD	Command	The 1 byte contains 2 ASCII codes. Common commands:

		03H (read register), 06H (read individual register), 08H (diagnostic function), 10H (write multiple registers)
DATA(n-1)	Data content	N words, =2N bytes, =4N ASCII (N<=8)
……		
DATA(0)		
LRC	Check code	The 1 byte contains 2 ASCII codes
End 1	End code 1	0DH, that is, CR
End 0	End code 0	0AH , that is LF

●RTU Mode

Name	Meaning	instruction
Start	Communication begins	A quiescent period of at least 3.5 bytes of transmission time
Address	Communication address	Communication address, that is the site number of the drive. For example, a drive site number is 32, and sixteen is 20H, Address =20H
CMD	Command	1 bytes. Common commands: 03H (read register), 06H (read individual register), 08H (diagnostic function), 10H (write multiple registers)
DATA(n-1)	Data content	N words, =2N bytes (N<=8)
……		
DATA(0)		
CRC	check code	1 bytes
End 1	End	A quiescent period of at least 3.5 bytes of transmission time

7.3 Common command code

7.3.1 Read multiple registers

03H: read multiple registers

Example: read the 2 words at the start address 0013H from the drive on the site number "01H".

1. ASCII mode

PC - upper monitor

start		':'
Address		'0'
		'1'
cmd		'0'
		'3'
Data start address	High position	'0'
		'0'
	Low positon	'1'
		'3'
read number of registers		'0'
		'0'
		'0'
		'2'
LRC		'E'
		'7'
END1(CR)		0DH
END0(LF)		0AH

In responser- upper monitor (OK)

start		':'
Address		'0'
		'1'
cmd		'0'
		'3'
Data bytes		'0'
		'4'
0013H address 0013H content	High position	'0'
		'0'
	Low positon	'3'
		'2'
0014H address 0014H content	High position	'0'
		'0'
	Low positon	'0'
		'A'
LRC		'B'
		'C'
END1(CR)		0DH
END0(LF)		0AH

(Error) In responser- upper monitor (Error)

start	':'
Address	'0'
	'1'
cmd	'8'
	'3'
Exception code	'0'
	'2'
LRC	'7'
	'A'
END1(CR)	0DH
END0(LF)	0AH

2. RTU mode

PC - upper monitor

Address		01H
CMD		03H
Data	High	00H

In responser- upper monitor (OK)

Address	01H
CMD	03H
Data bytes	04H

(Error) In responser- upper monitor (Error)

Address	01H
CMD	83H
Exception	02H

start address	position	
		13H
read number of registers		00H
		02H
CRC low position		35H
CRC High position		CEH

The content of the 0013H address	High position	00H
	low position	32H
The content of the 0014H address	High position	00H
	low position	0AH
CRC low position		DBH
CRC High position		FBH

code	
CRC position	C0H
CRC High position	F1H

7.3.2 Write single register

06H： Write single register

Description: writes a word to the register.

For example, the drive station number is 01, and the write data start address is 0013H, and the data 100 (64H) is written.

1. ASCII Mode

PC - upper monitor

start		':'
Address		'0'
		'1'
cmd		'0'
		'6'
Data start addres	High position	'0'
		'0'

In responser- upper monitor (OK)

start		':'
Address		'0'
		'1'
cmd		'0'
		'6'
Data start addres	High position	'0'
		'0'

In responser- upper monitor (Error)

start	':'
Address	'0'
	'1'
cmd	'8'
	'6'
Exception code	'0'
	'3'

s	low position	‘1’
		‘3’
Data content (word format)		‘0’
		‘0’
		‘6’
		‘4’
LRC		‘8’
		‘2’
END1(CR)		0DH
END0(LF)		0AH

s	low position	‘1’
		‘3’
Data content (word format)		‘0’
		‘0’
		‘6’
		‘4’
LRC		‘8’
		‘2’
END1(CR)		0DH
END0(LF)		0AH

LRC	‘7’
	‘6’
END1(CR)	0DH
END0(LF)	0AH

2. RTU mode

PC - upper monitor

Address		01H
CMD		06H
Data start address	High position	00H
	low position	13H
Data content (word format)		00H
		64H
CRC low position		79H
CRC High position		E4H

In responser- upper monitor (OK)

Address		01H
CMD		06H
Data start address	High position	00H
	low position	13H
Data content (word format)	F4H	00H
	48H	64H
CRC low position		79H
CRC High position		E4H

(Error) In responser- upper monitor (Error)

Address	01H
CMD	86H
Exception code	03H
CRC low position	02H
CRC High position	61H

7.3.3 Diagnosis

08H: diagnostic function

Instructions: use the sub function code 0000H to check the transmission signals between Master and Slaver. The data content can be any number.

For example, use diagnostic features for a site 01H driver.

1. ASCII Mode

PC - upper monitor

start		':'
Address		'0'
		'1'
cmd		'0'
		'8'
Sub function code	High position	'0'
		'0'
	Low position	'0'
		'0'
Data content (word format)		'8'
		'6'
		'3'
		'1'
LRC		'4'
		'0'
END1(CR)		0DH
END0(LF)		0AH

In responser- upper monitor (OK)

start		':'
Address		'0'
		'1'
cmd		'0'
		'8'
Sub function code	High position	'0'
		'0'
	low position	'0'
		'0'
Data content (word format)	High position	'8'
		'6'
	low position	'3'
		'1'
LRC		'4'
		'0'
END1(CR)		0D H
END0(LF)		0A H

In responser- upper monitor (Error)

start	':'
Address	'0'
	'1'
cmd	'8'
	'8'
Exception code	'0'
	'3'
LRC	'7'
	'4'
END1(CR)	0DH
END0(LF)	0AH

2. RTU Mode

PC - upper monitor

Address		01H
CMD		08H
Sub function code	High position	00H
	low position	00H
Data content (word format)	High position	86H
	低位 low position	31H
CRC low position		43H
CRC High position		BFH

In responser- upper monitor (OK)

Address		01H
CMD		08H
Sub function code	High position	00H
	low position	00H
Data content (word format)	High position	86H
	low position	31H
CRC low position		43H
CRC High position		BFH

In responser- upper monitor (Error)

Address	01H
CMD	88H
Exception code	03H
low position	06H
CRC High position	01H

7.3.4 Write multiple registers

10H: writes multiple registers

Description: writes N words to a continuous register, with a maximum N of 8 (08H).

For example, write 100 (0064H) and 300 (012CH) to the station number 01, the two consecutive registers of the start address 0013H of the servo drive.

1. ASCII Mode

PC - upper monitor

start	':'
Address	'0'
	'1'

In responser- upper monitor (OK)

start	':'
Address	'0'
	'1'

In responser- upper monitor (Error)

start	':'
Address	'0'
	'1'

cmd		‘1’
		‘0’
Data start address	High positon	‘0’
		‘0’
	low position	‘1’
		‘3’
Read number of registers		‘0’
		‘0’
		‘0’
		‘2’
Data bytes		‘0’
		‘4’
0013H Write data to 0013H	High positon	‘0’
		‘0’
	low position	‘6’
		‘4’
0014H Write data to 0014H	High positon	‘0’
		‘1’
	low position	‘2’
		‘C’

cmd		‘1’
		‘0’
Data start address	High positon	‘0’
		‘0’
	low position	‘1’
		‘3’
Read number of registers	High positon	‘0’
		‘0’
	low position	‘0’
		‘2’
LRC		‘4’
		‘1’
END1(CR)		0DH
END0(LF)		0AH

cmd	‘9’
	‘0’
Exception code	‘0’
	‘3’
LRC	‘6’
	‘C’
END1(CR)	0DH
END0(LF)	0AH

LRC	‘4’
	‘5’
END1(CR)	0D H
END0(LF)	0AH

2. RTU Mode

PC - upper monitor

Address		01H
CMD		10H
Data start address	High positon	00H
	low positio n	13H
Write number of registers	High positon	00H
	low positio n	02H
Data bytes		04H
0013H Write data to 0013H	High positon	00H
	低位 low positio n	64H
0014H Write data to 0014H	High positon	01H
	low positio	2CH

In responser- upper monitor (OK)

Address		01H
CMD		10H
Data start address	High positon	00H
	low position	13H
Write number of registers	High positon	00H
	low position	02H
CRC low position		B0H
CRC High positon		0DH

In responser- upper monitor (Error)

Address	01H
CMD	90H
Exceptio n code	03H
CRC low position	0CH
CRC High positon	01H

	n	
CRC low position		F3H
CRC High positon		24H

Note 1: registers are all 16 bit signed integers.

Note 2: when reading the Dn-13 parameter, the actual voltage value = read value /100.

7.3.5 Check code calculation

1. LRC check

ASCII mode uses LRC (Longitudinal, Redundancy, Check) checksum. LRC check is the sum of the calculation of Address and CMD, starting data address and data content, the sum of the result by 256 units, take the remainder (if the sum of the result is 150H, only 50H), and then calculate the complement, the final results obtained for LRC check code.

Example: read 2 words (word) from the 0013 address of the site 01 H servo driver.

start		':'
Address		'0'
		'1'
cmd		'0'
		'3'
Data start address	High positon	'0'
		'0'
	low position	'1'
		'3'
Read Number of registers		'0'
		'0'
		'0'
		'2'
LRC		'E'
		'7'
END1(CR)		0DH
END0(LF)		0AH

Add the data from Address to the last data:

01 H +03H+00H+13H+00H+02H=19H,因 19H 的补码为 E7H，所以 LRC 为'E'，'7'

01H+03H+00H+13H+00H+02H=19H, because 19H's complement is E7H, so LRC is' E ',' 7 '

2. CRC check

Rtu mode is used CRC（Cyclical Redundancy Check）check code. The cyclic redundancy check (CRC) field is two bytes, containing a binary 16 bit value. The value of the CRC appended to the message is computed by the sending device. The receiving device re calculates the value of the CRC when the message is received, and compares the calculated result with the actual received CRC value. If the two values are not equal, they are wrong.

The CRC calculations start with a 16 bit register with a full 1., and then follow the successive 8 bit section of the message for subsequent calculations. Only 8 data bits in the character are involved in generating CRC operations, starting bits, stop bits, and parity bits, and are not involved in CRC calculations.

The process of generating CRC is:

1. load a 16 bit register into sixteen hexadecimal FFFF (full 1). This is called the CRC register
2. exclusive of the first 8 bit byte of the message with the low byte of the 16 bit CRC register, which is placed in the CRC register
3. shift the CRC register to 1 bits (to the LSB direction), and MSB to zero. Extract and detect the LSB.
4. (if LSB is 0): repeat step 3 (another shift)

   (if LSB is 1): XOR polynomial for the CRC register, 0xA001 (1010000000000001)
5. repeat steps 3 and 4 until the 8 shift is completed. When this is done, complete operation of the 8 bit byte is completed.
6. repeat the steps 2 to 5 in the next byte of the message, continue this operation until all messages have been processed.
7. The final content in the CRC register is the CRC value.
8. when the CRC is placed on the message, the high and low byte must be exchanged. The low byte is sent first, followed by the high byte

For example, read 2 words (word) from the drive with the site number 01 H and read the start address as 0200 H address. From the Address to the last bit of data, the final content of the calculated CRC register is 0704 H, and the instruction format is as follows. Note that the 04H is transmitted in front of 07 H.

Address		01H
CMD		03H
Data start address	High positon	02H
	low position	00H
Data length (calculated in word)		00H
		02H

CRC low position	C5H
CRC high position	B3H

CRC generation paradigm:

CRC values are generated in the C language below. This function requires two arguments.

unsigned char * data; // The data start address used to calculate the CRC value

unsigned char length; // Data length

This function returns the CRC value of the unsigned integer type.

```
unsigned int crc_chk(unsigned char * data,unsigned char length)
{
   int i,j;
   unsigned int crc_reg=oxFFFF;
    While(length- -)
    {
     Crc_ reg ^=*data++;
     for(j=0;j<8;j++)
     {
         If(crc_reg & 0x01)
         {
            crc_reg=( crc_reg >>1)^0xA001;
         }else
         {
          crc_reg＝crc_reg >>1;
         }
     }
   }
   return crc_reg;
}
```

7.3.6 Exception code

Communication errors may occur during communications, and common error events are shown below:

Communication error event	Servo driver response method
The data address is incorrect when you read and write arguments;	The request does not process and returns an error exception code

When writing a parameter, the number of data is written more than the maximum or the data is not within the range of the parameter;	The request does not process and returns an error exception code
Data transmission error or checksum code (LRC, CRC, parity check) error	The data is discarded and no response is returned. The host should treat the request as a timeout state

When the drive sends an error exception code, the command function code is added to the 80H and sent to the ModBus master system. If it is in broadcast mode, no exception code or data is returned. The exception code is shown below:

01 H	The servo driver cannot recognize the requested function code
02 H	The requested data address is illegal
03 H	The requested data is not allowed in the servo drive (the number of read and write data exceeds the maximum allowable value of the drive or the write data value is not within the parameter range)
04 H	The servo drive is already executing the request, but it cannot complete the request.

7.4 Servo parameter, status information, communication address

Data address		Meaning	Explain	Operation authority
Hexadecimal	Decimal system			
0000H~00ECH	0 ~ 236	Parameter setting area	Pn000~Pn236 Corresponding Pn000~Pn236	Read-write
0164H~016DH	356 ~ 365	Alarm recording area	In Fn000, you can view the corresponding Sn--0~Sn--9	read-only
0170H~018CH	368 ~ 396	Data monitoring area	Dn000~Dn028Corresponding Dn000~Dn028	write-only

The eighth chapter, operation and adjustment

According to the wiring diagram, after installation and connection, check the following items before power on:

◢Is the power supply terminal properly and reliable? Is the input voltage correct?

◢Is there any short circuit or earthing of the power line and motor line?

◢Is the encoder cable correct?

◢Are the drive units and motors firmly secured?

◢Is the motor shaft connected to the load at the end?

◢Is the brake resistance connection (optional) correct?

◢Is the serial communication line (optional) properly connected?

8.1 Inching operation

(1) servo enable (SON) OFF. The internal enable (Pn003=0) or external wiring control enables the OFF to be in a state. It is recommended that the CN2 control interface do not receive any control lines.

(2) switch on the circuit power, drive 5 digital tube display light, if there is an alarm, then 5 decimal point has been flashing, and display alarm code AL-xx. Please check the connection.

(3) confirmed that no alarm and any abnormal situation, enter the auxiliary mode Fn002 subdirectory JOG_0 (specific operation and parameter settings see Chapter third section 3.4.4 Fn002 trial operation), hold the key to reversing operation, release button, motor reducer, no electricity.

8.2 Push-button speed control

(1) servo enable (SON) OFF. The internal enable (Pn003=0) or external wiring control enables the OFF to be in a state. It is recommended that the CN2 control interface do not receive any control lines.

(2) switch on the circuit power, the driver of the 5 digital tube display light, and if there is an alarm, the decimal point has been flashing, and display alarm code AL-xx. Please check the connection.

(3) to confirm that no alarms and any exceptions have been entered into the auxiliary mode Fn002

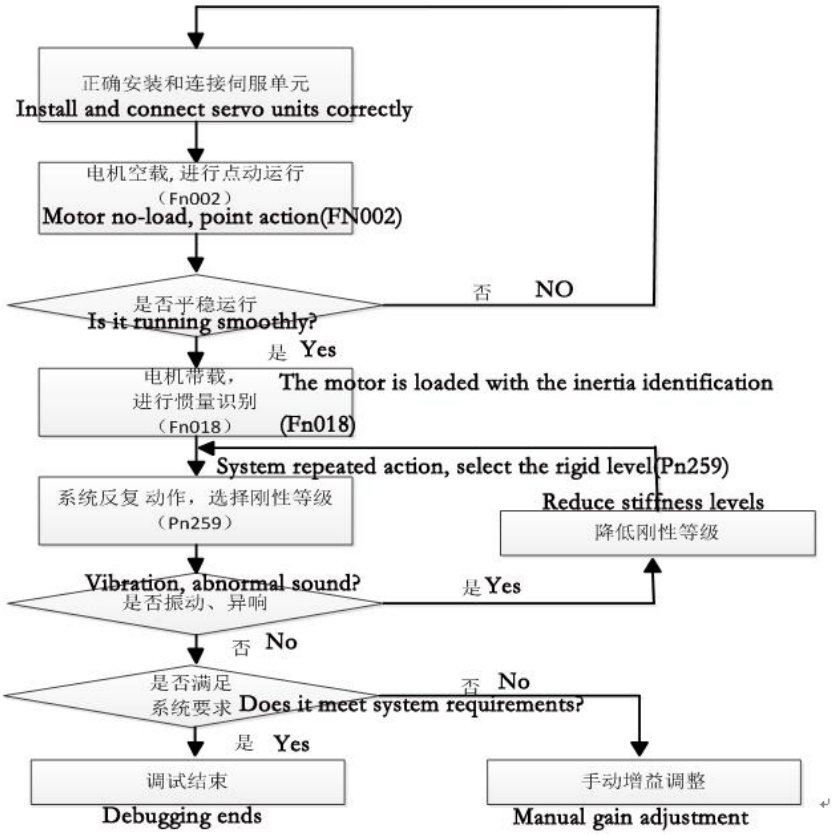
subdirectory JOG_1 (specific operations and parameter settings, see Chapter third, section 3.4.4, Fn002, trial operation). After entering the lower directory of JOG_1, the display is shown as 0 (unit: r/min), and the motor has been energized. Through the key or key, the input motor will be running at speed, the motor will run at this speed. To exit this operation, you need to perform JOG_2 operations.

8.3 Gain tuning

Gain tuning is a function of optimizing servo response performance by adjusting servo gain parameter combination (inertia ratio, position loop gain, speed loop proportional gain, speed loop integration time, instruction filter, etc.). When servo gain is adjusted, the interaction between parameters must be taken into account, so it is necessary to balance the parameters of each gain and not to set extreme parameters.

In general, high stiffness machines can improve responsiveness by increasing servo gain. For low rigidity machines, the increase of servo gain may produce vibration and bring about negative effects. At this point, vibration can be suppressed by reducing the stiffness levels or various vibration suppression functions of the servo unit.

The general system debugging process is shown below:



8.3.1 System inertia identification

Automatic tuning refers to the identification of the load inertia during the operation of the servo to achieve the mechanical rigidity grade
(Pn259) setting requirements. In order to achieve better response performance, inertia identification must be carried out.
In the following cases, the inertia calculation may not be effective:

●Load inertia changes rapidly
●Mechanical rigidity is very low
●The mechanical components are not firmly connected, for example, there is a reverse clearance
●Maximum speed of less than 150 rpm and continuous low speed use
●加减速在1秒内2000转/分以下的和缓状态A slowing state of 2000 revolutions per minute in a second
●Load rigidity is easy to produce small amplitude vibration or friction

Related parameters of inertia estimation:

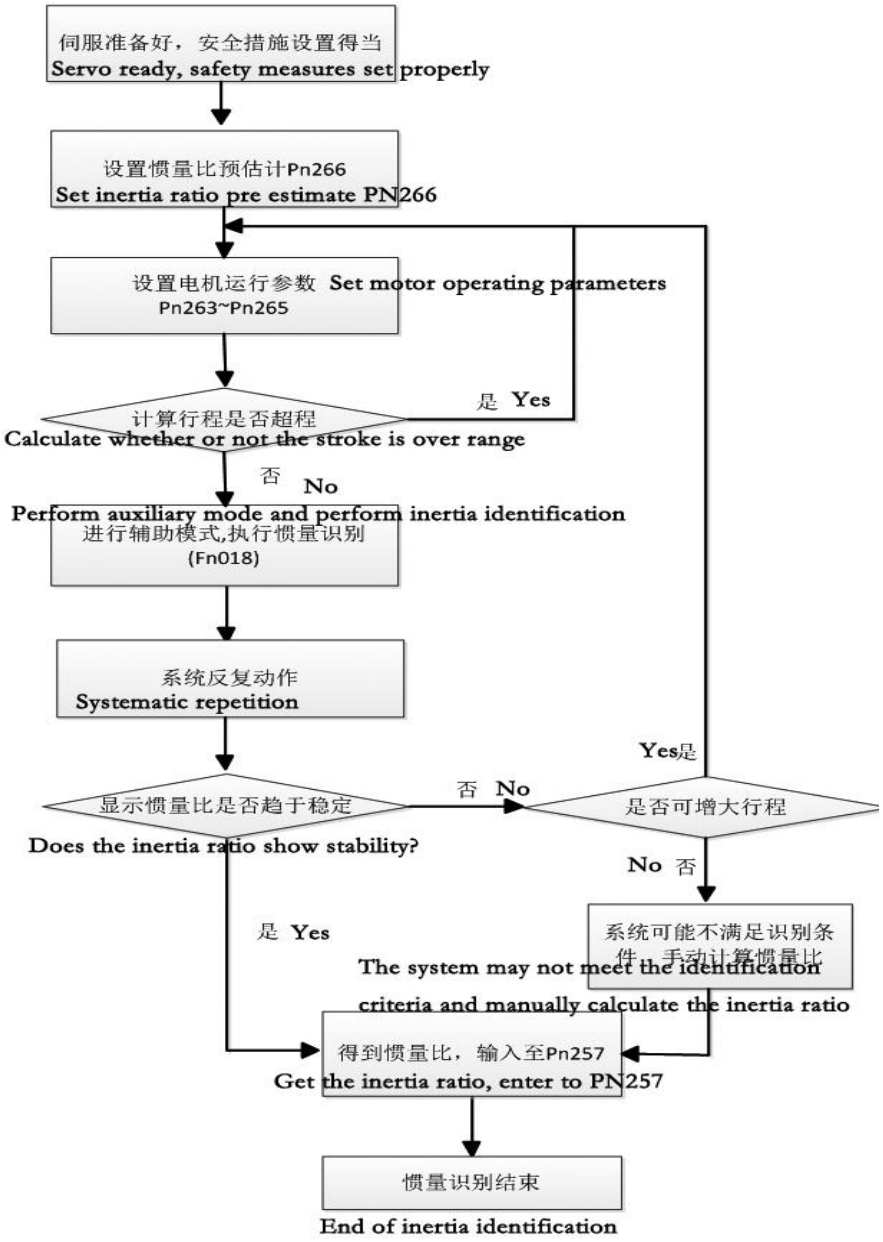
Pn257	Load inertia ratio	0~100.00	1.00	times
Pn263◆	Inertia estimation acceleration and deceleration time	20~500	80	ms
Pn264◆	Inertia estimation allows maximum speed	150~1000	400	r/min
Pn265◆	Inertia estimation pause interval	0~10000	500	ms
Pn266◆	Inertia estimation; inertia ratio; prediction value	1.00~20.00	3.00	倍 times

The stroke of inertia estimation: S=V*T=Pn264* (Pn263/60000). By default, the maximum approximation stroke is S=400*80/60000=0.53 turn (2500 line encoder).

The following settings must be set before starting the offline inertia estimation operation:

●Main power is in.
●Servo not enabled.
●Install limit switches using forward drive inhibit (CCWL) and reverse drive inhibit (CWL) function,Prevent accidents caused by mechanical accidents.
●When the parameters are set properly, the motor acceleration and deceleration time and running speed are estimated by inertia,
Try to avoid gentle and low speed running condition.

The general flow of inertia identification is as follows:



惯量识别流程图

Flow chart of inertia identification

8.3.2 Automatic gain adjustment

For automatic gain adjustment, the mechanical rigidity setting consists of the following 21 types. In setting the gain adjustment mode (Pn258) is 1, the mechanical rigidity level (Pn259), will be based on the servo gain parameter setting table to automatically select the servo gain (position loop gain, speed loop gain, speed loop integral time constant, torque command filter time). At this point, gain parameters such as Pn115, Pn116, Pn153~P156, Pn196, and Pn197 are not valid in automatic gain adjustment mode.

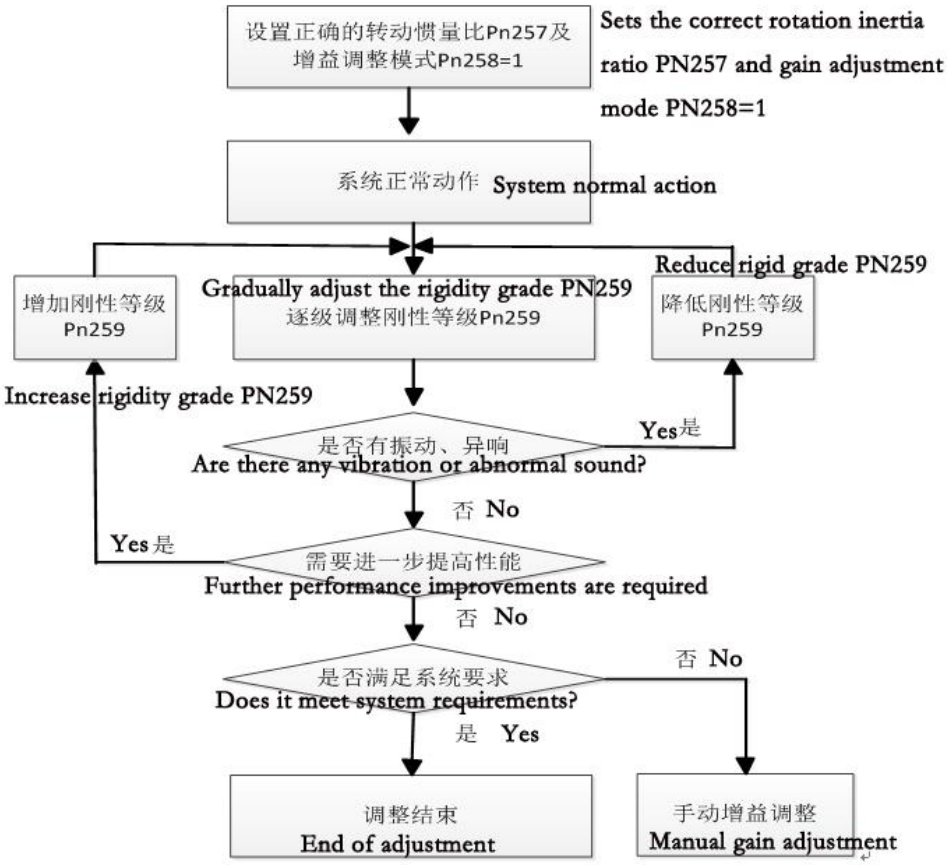
The gain parameter setting table is as follows:

Mechanical stiffness class Pn259	Position loop gain [1/s]	Speed loop gain [Hz]	Velocity loop integral time constant [0.1ms]	Torque filtering time [0.01ms]
0	10	10	550	220
1	15	15	500	180
2	20	20	450	150
3	30	30	300	110
4	40	40	200	60
5	50	50	160	45
6	60	60	150	40
7	85	85	100	35
8	115	115	95	30
9	120	120	91	25
10	130	140	85	22
11	150	160	60	20
12	180	200	50	15
13	195	220	40	12
14	210	250	35	10
15	230	270	30	10
16	250	300	29	10
17	270	350	27	10
18	330	400	22	10
19	380	450	19	10
20	450	500	17	10

When the gain is adjusted, if the mechanical rigidity setting value is increased, the response of the servo will be improved, and the positioning time will be shortened. However, excessive gains can cause mechanical vibrations. Therefore, in case of no vibration, increase from low stiffness to level up, and the gain must remain margin to avoid critical condition.

For low load devices such as pulleys, the rigid level of the device cannot be too high, but a higher rigidity class can be set up, such as a ball screw, which is connected with a rigid load device.

The general flowchart of gain adjustment is as follows:



8.3.3 Manual gain adjustment

When manual gain adjustment is performed, set Pn258 to 0. The response characteristics of the servo unit are adjusted by the following servo gain parameters.

NO.	Name	Range of values	Default value	Unit	Apply
Pn045	Gain switching selection	0~5	0	-	All
Pn115	Position regulator gain 1	1~2000	100	1/S	P
Pn116	Position regulator gain 2	1~2000	100	1/S	P

Pn153	Speed regulator proportional gain 1	1~ 2000	80	Hz	All
Pn154	Speed regulator integration time constant 1	1~ 5000	150	0.1ms	All
Pn155	Speed regulator proportional gain 2	1~ 2000	80	Hz	All
Pn156	Speed regulator integration time constant 2	1~ 5000	150	0.1ms	All
Pn196▲	Torque instruction filtering time constant 1	1~5000	40	0.01ms	All
Pn197▲	Torque instruction filtering time constant 2	1~5000	40	0.01ms	All

Manual gain adjustment general process is as follows:

step	Content
1	Correct setting of inertia ratio Pn257. Set Pn258 to 0.
2	As long as the machine does not generate vibration, the speed ring gain (Pn153, Pn155) is increased as much as possible, and the speed loop integration time constant (Pn154, Pn156) is reduced.
3	Adjust the torque instruction filter time parameter (Pn196, Pn197) and place the setpoint that does not generate vibration.
4	Repeat the 2 and 3 steps. In the case of meeting the system requirements, reduce the speed ring gain properly, increase the integral time constant of the speed ring, and leave the margin.
5	The position loop gain (Pn115, Pn116) is gradually increased in the range of no vibration when the position is controlled.

Note 1: by default, Pn045=0, the first set of gains is valid, and there is no need to set two sets at the same time.

Note 2: parameter tuning can be carried out on the basis of proper reference to the gain parameter setting table.

8.3.4 Jitter suppression method

When servo gain is too high, motor spindle wobble may occur. To avoid jitter, you can do as follows:

● When the position is complete, the servo gain is reduced properly and the vibration suppression function parameter (Pn139~Pn141) is used.

- Set the correct load inertia ratio. For large inertia load or high rigidity and fast response device, too small speed loop time integration constant is easy to cause positioning overshoot or swing.

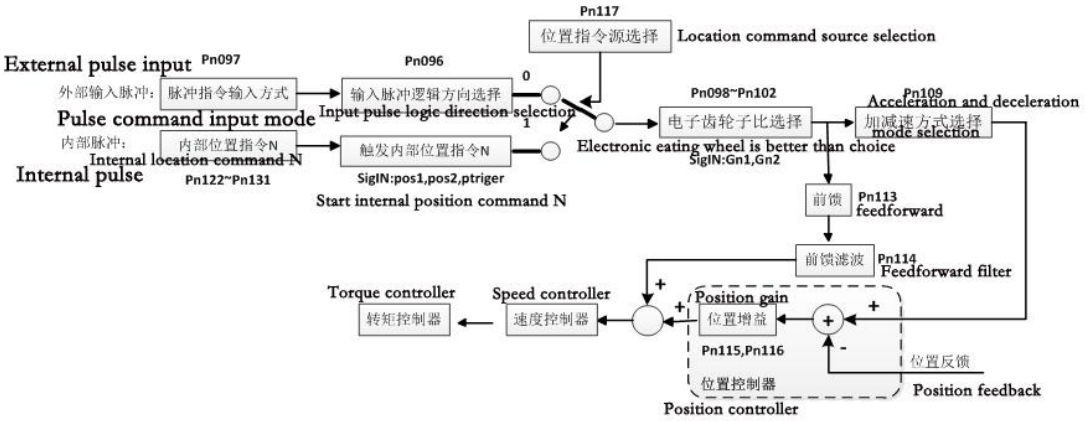
- Using the gain switching function (Appendix A), the jitter band gain is reduced.

- Appropriately increase the torque instruction filter time parameter (Pn196, Pn197).

- Regulation speed feedback compensation (Pn183). The greater the speed feedback compensation, the faster the response, but the more noise the motor.

9.1 Position control example

9.1.1 Position control structure diagram



9.1.2 Example of position control

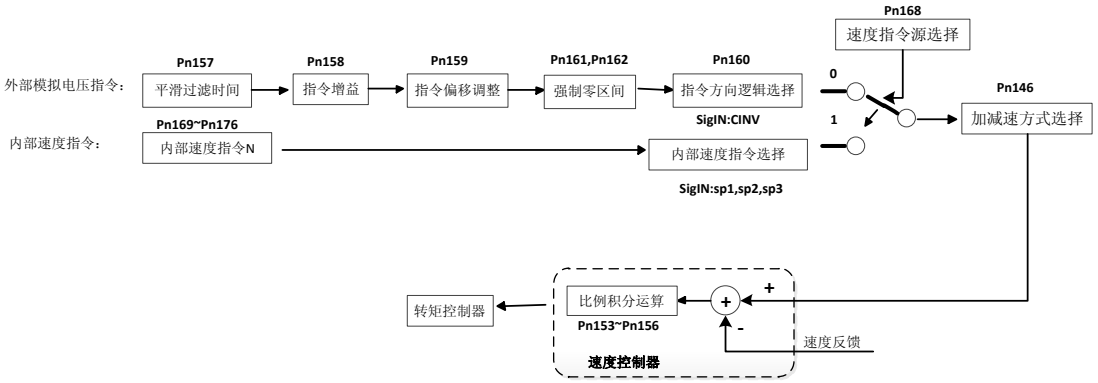
External pulse direction in the form of input 20K frequency of the positive pulse, the number of transmission 15 thousand, electronic gear ratio 3:1, plus and deceleration time 60ms. The parameters you need to set:

Pn097=0,Pn096=0,Pn117=0,Pn098=3,Pn109=1,Pn110=60。

If an external port enable motor is not used, the Pn003=1 can be set internally with an automatic enable motor. When the external input pulse, the motor counter clockwise rotation 4.5 times (2500 line encoder).

9.2 Example of speed control

9.2.1 Speed control structure diagram

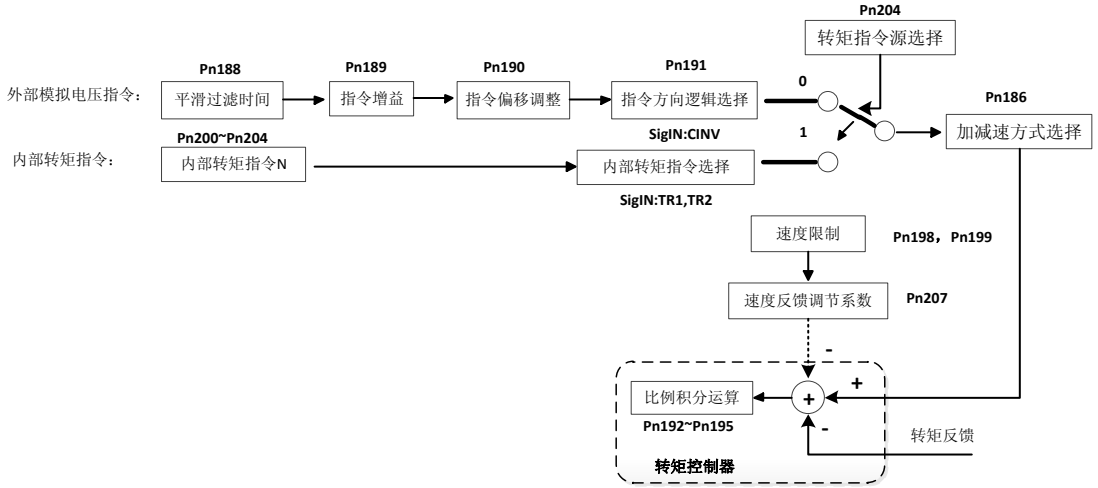


9.2.2 Example of speed control

Adopt internal speed control, drive internal enable, motor clockwise rotation, speed of 600rpm, using S curve acceleration and deceleration, Ts=10ms, Ta=30ms, Td=100ms. Parameters to set: Pn002=1,Pn003=1，Pn146=1，Pn147=10，Pn148=30，Pn149=100，Pn168=1，Pn169= -600。

9.3 Torque control example

9.3.1 Torque control structure diagram



9.3.2 Example of torque control

The external analog voltage output 0.5V, torque reached 15% of the rated torque, when the motor is light load, the maximum speed limit is 1800rpm, the acceleration and deceleration time is 500ms, the internal automatic enable work.

Set parameters as follows: Pn002=0,Pn003=1,Pn186=1,Pn187=500,Pn198=1800， Pn204=0。
Note: under the condition of no load or light load, the actual torque can not reach the input torque command, and the motor runs at the highest limit speed.

9.4 Electronic gear ratio calculation

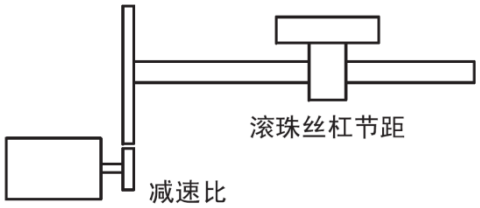
An electronic gear function is a function of the amount of movement of 1 input pulse instructions. The 1 input pulse command is also called the 1 instruction unit". Through the adjustment of the electronic gear ratio, the instruction controller can be controlled without regard to the reduction ratio of the machine or the number of lines of the encoder.

1 Determine machine specifications

The elements associated with the electronic gear are as follows:

- Reduction ratio
- Ball screw pitch
- Pulley diameter, etc.

Ball screw pitch



Reduction ratio

2 Servo motor encoder pulse number

Speed fbk sel	Single loop pulse number
Incremental encoder	10000
17 bit absolute encoder	131072

3 Decision instruction unit

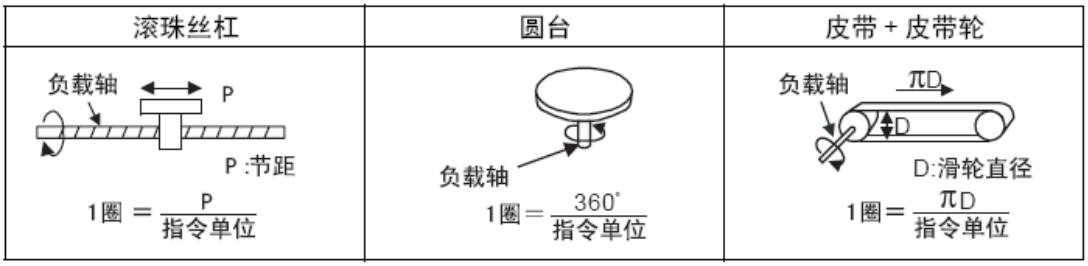
The instruction unit is the smallest unit indicating the moving position information of the load. The unit of instruction should be considered in terms of machine specifications and positioning accuracy. Commonly used physical units can be used as the smallest instruction units, such as 0.01mm, 0.001mm, 0.1 degrees, etc..

4 According to the instruction unit, the amount of load movement in the 1 turns of the load shaft is calculated.

Load shaft rotates 1 cycles of load movement (instruction unit) = load axis rotates 1 cycles of load movement / instruction unit

Example: ball screw pitch 6mm, instruction unit 0.001mm, 6/0.001=6000 (instruction unit).

ball screw circular truncated cone Belt + pulley



5 Find out the ratio of the electronic gear.

It is assumed that the reduction ratio of the motor shaft and the load shaft is (m/n), that is, the servo motor rotates m circle and the load shaft rotates n.

Electronic gear ratio = number of pulses per unit of rotation / (load shaft rotation, 1 turns of load movement (instruction units)) Xm/n

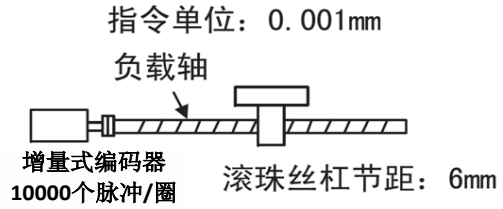
6 Setting parameters

After dividing the electronic gear, it is set as user parameter.

Electronic gear ratio (after reduction) =Pn098/Pn102

9.5 Example of electronic gear ratio

9.5.1 ball screw

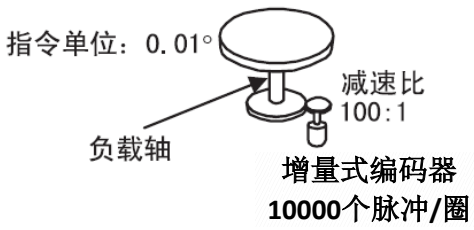


Load shaft rotates 1 cycles of load movement (instruction unit) =6mm/0.001mm=6000

Electronic gear ratio =10000/6000=5/3.

Set Pn098=5, Pn102=3.

9.5.2 circular truncated cone

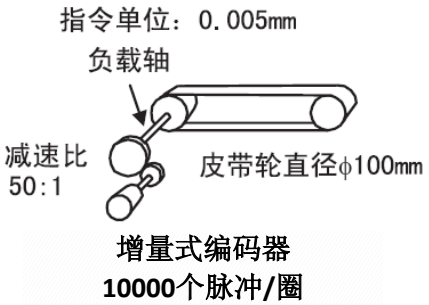


Load shaft rotates 1 cycles of load movement (instruction unit) =360 degrees /0.01 degrees =36000.

Electronic gear ratio =10000/36000*100=250/9.

Pn098=250, Pn102=6。 Set Pn098=250, Pn102=6.

9.5.3 Belt + pulley



Load shaft rotates 1 cycles of load movement (instruction unit) =3.14*100/0.005=62800.

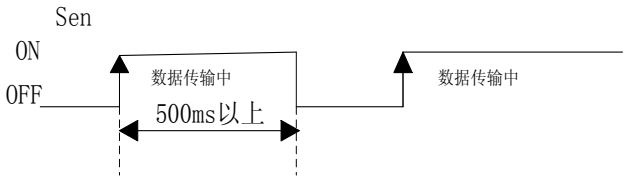
Electronic gear ratio =10000/62800*50=1250/157.

Set Pn098=1250, Pn102=157.

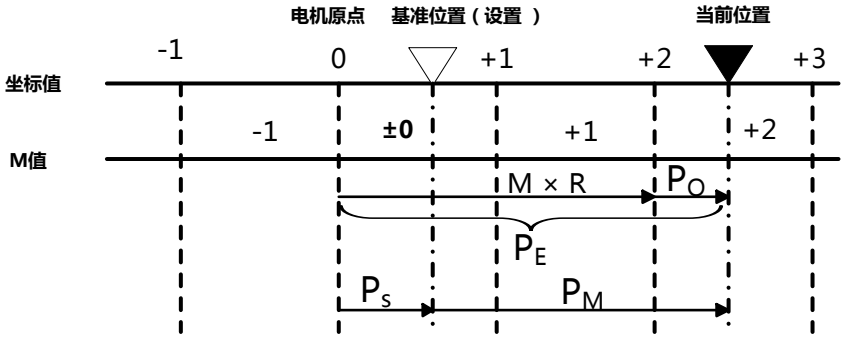
The tenth chapter, the use of absolute servo unit

10.1 Absolute data output mode

Can not wait on the can, the computer can through the port SigIn:Sen signal, request to read encoder single loop multi ring data information. Read the following sequence:



- Please do not rotate the motor when you read single or multi coil data.
- In the absence of malfunction of encoder communications, normal data will be output, otherwise no response will be made.
- During the servo transmission encoder data, if the Sen signal is changed from OFF to ON again, the response will not be made until the data transmission is complete.
- During servo sending encoder data information, if the servo enable signal son or internal enable is valid, it will not respond until the data transmission is complete.



绝对位置设置与计算图解

The final absolute value data, PM, is derived from the following formula:

PE= M × R + PO

PM = PE - Ps

Among them:

PE: the current value read from the encoder

M: multi turn volume data

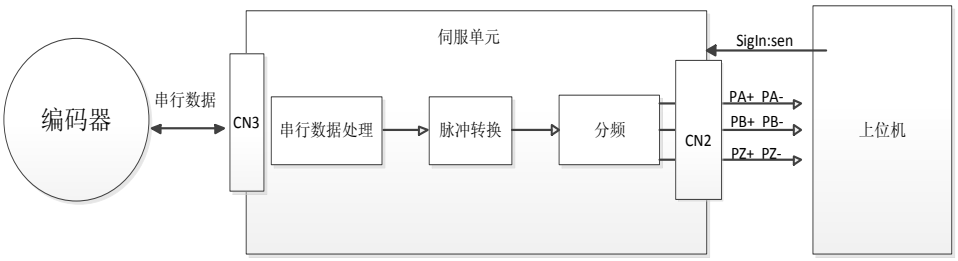
R: encoder rotates the number of pulses in 1 turns (values after frequency division)

PO: the number of initial increments (absolute position within a single loop)

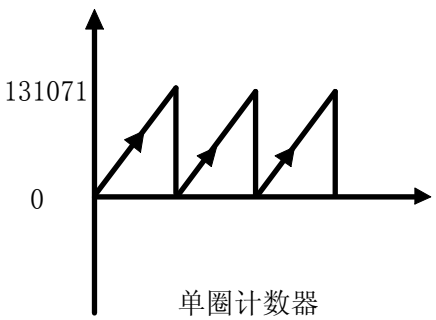
PS: the offset of the reference position relative to the origin of the motor. The initial increment is saved and managed by the host computer

PM: the current position value that a user needs relative to the base position

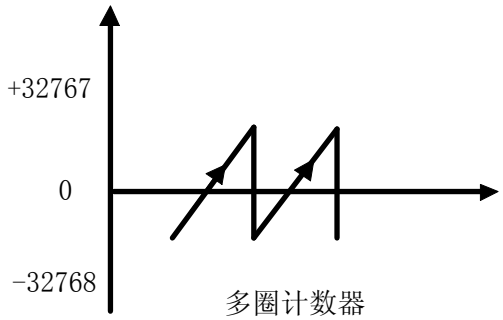
10.2 Absolute data transceiver timing



Absolute servo unit data information transceiver frame



Single loop counter



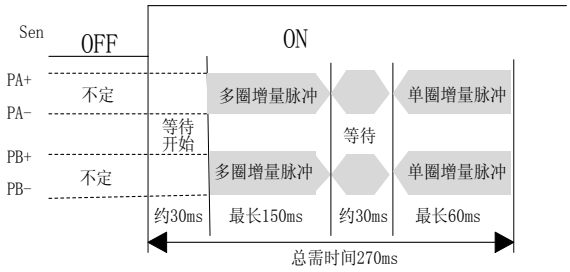
Multiple loop counter

servo motor	Single loop data output range	Multi loop data output range	Over time operation
It is equipped with 17 bit absolute encoder	0~131071	-32768 ~+32767	Multi ring data is higher than the forward direction limit value (+32767): multi loop data = -32768 Multi ring data is lower than the reverse direction limit value (-32768); multi loop data = +32767

When Pn218=0, incremental send single circle and multi circle absolute position data information. It is recommended to read multiple times to get the correct absolute position.

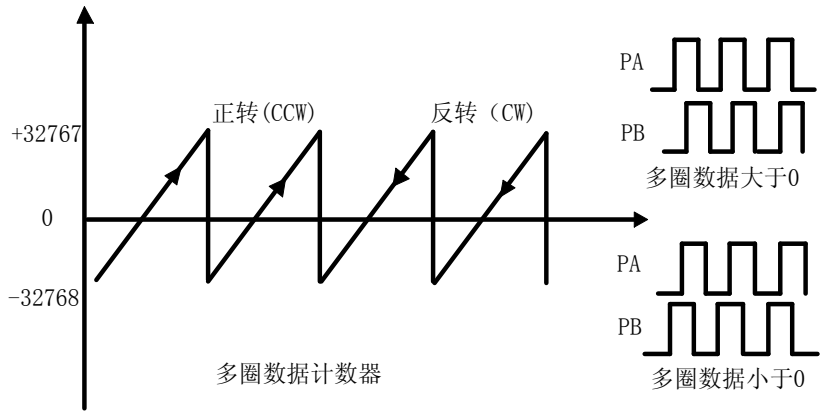
Signal name	state	Signal content
PA+ PA-	Transceiver state	Initial increment pulse
	Normal state	Delta pulse
PB+ PB-	Transceiver state	Initial increment pulse
	Normal state	Delta pulse
PZ+ PZ-	Transceiver state	Low level
	Normal state	Origin pulse

A single loop increment pulse is a pulse equal to the pulse speed at which the 1500r/min frequency rotates from the origin position of the motor shaft to the position of the current motor shaft. Like the usual incremental pulse, the single loop position pulse is output by frequency divider inside the servo unit. The number of multi loop pulse increments represents the multi ring position data, which is not output by the divider. Example: in a multi loop increment pulse, the number of pulses received is +300, representing the motor axis in the 300th loop.



初始增量型脉冲发送时序

Due to the range of multi loop data -32768~32767, when the multi ring data is positive, the motor rotates counterclockwise (CCW); when it is negative, the motor rotates clockwise (CW). By default, when the multi loop data is positive, the PA advances PB, whereas the PA lags PB. The range of the single loop data is 0~131071, and the PA is advanced PB.

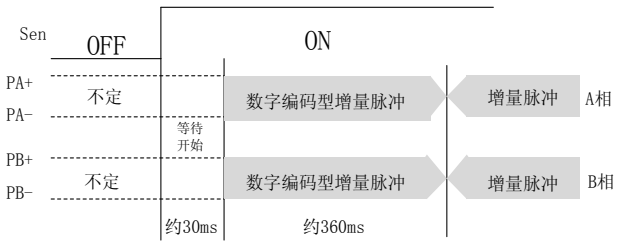


Note: if the Pn018 encoder AB phase logic takes the inverse parameter set to 1, then the PA and PB phases are reversed, and the multi loop data symbols are inverted.

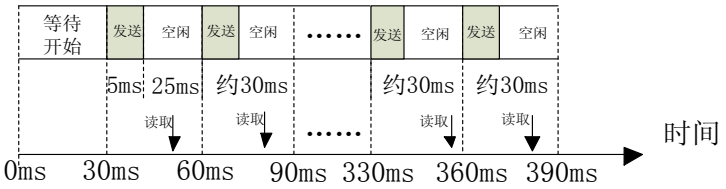
Pn218=1 sends single loop and multi circle absolute position data in the form of pulse digital encoding. It is recommended to read multiple times to get the correct absolute position.

Signal name	state	Signal content
PA+ PA-	Transceiver state	Digitally coded delta pulse
	Normal state	Delta pulse
PB+ PB-	Transceiver state	Digitally coded delta pulse
	Normal state	Delta pulse
PZ+ PZ-	Transceiver state	Low level
	Normal state	Origin pulse

（0~15->0~F）。Digital coded delta pulse: at about 30ms, the servo will send several pulses, and the number of pulses will be considered a sixteen digit number (0~15->0~F).



数字编码型增量脉冲发送时序



数字编码型增量脉冲帧格式

N1~N4	N5~N8	N9~N12
16 bit, multi ring data (signed integer)	16 bit single loop data (unsigned integer)	16 bit CRC checksum (unsigned integer)

When sending a pulse, the pulse increments for each send are sent within 0~15 and completed within 5ms. When the Sen signal of the host computer is changed from off to on, the timing is started. Considering the fixed response delay of a few milliseconds, the upper computer must select the appropriate time point to read the number of pulse changes (sixteen hex). For example, in 30ms, the servo sends 3 pulses, and the upper computer can read the pulse increments at 50ms, with the number of 3 representing the number 3. After reading, wait for tens of milliseconds, in the 80ms read second pulse increments, and so on, and so on.

For example

次序	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12
Pulse number	0	3	14	8	1	0	10	5	4	13	14	15
	High 0x03		Low 0xe8		High 0x10		Low 0xA5		CRC low 0x4D		CRC high 0xEF	
Result	Multi circle data: 03e8H=+1000				Single loop data: 10A5H=4261				CRC:EF4DH			

Data frame (8bits)	03H	E8H	10H	A5H	4DH	EFH

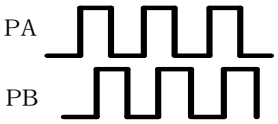
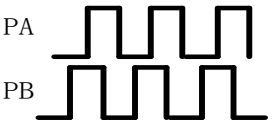
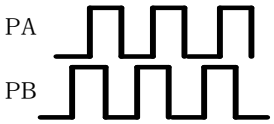
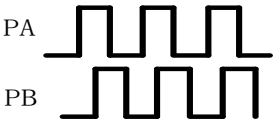
Among them: CRC polynomial using Modbus protocol polynomial: 0xA001, its algorithm and code have been detailed in the seventh chapter Modbus communication function.

In addition, the host computer can also read the absolute position information (Dn025~Dn028) by using MODBUS serial communication.

10.3 ABZ pulse frequency division output

● By setting the Pn018 parameter, the phase relation of the AB pulse signal can be changed.

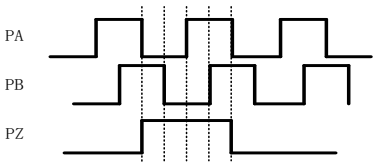
Pn018	ccw	cw

0		
1		

● By setting the Pn217 parameter, the number of pulses per turn output can be changed.

● Phase relation of Z pulse

The Z signal is aligned with the edge of the A or B signal and lasts 4 pulses of time.



10.4 Initialization of absolute encoder

When the following happens, the absolute encoder must be initialized by the Fn015 operation:

●Initially start the mechanical equipment

●Encoder battery low voltage alarm

●Internal fault alarm of encoder occurs

●To set the absolute encoder's multi circle data to 0

When the absolute encoder alarm, and without the need to reset the multi ring data information, Fn016 operations can be carried out to remove the alarm on the encoder.

10.5 Installation of absolute encoder batteries

When the Pn216 is set to 1, the absolute encoder is used in many circles. In order to save the position data of the absolute encoder, the battery unit needs to be installed. Install the battery unit on either side of the upper or servo unit. Please do not set up the battery unit on the upper and servo units. If the battery is set on both sides at the same time, the circuit will be formed, which is very dangerous. The battery must be between 3.2V~4.5V, the high voltage will damage the encoder, and the low voltage will produce a low voltage alarm. In general, please use 3.6V 2000amH lithium battery.

Before you replace the battery, just switch on the power. Do not enable the motor to operate. If you remove the battery in the power control OFF servo unit (including after remove the encoder

cable), the absolute value of the encoder data will be lost, at this time, to carry out the Fn015 operation, reset multi ring data information.

When replacing the battery, please pay attention to the polarity of the battery and the serial number of the driver. If polarity is reversed, the encoder will be damaged.

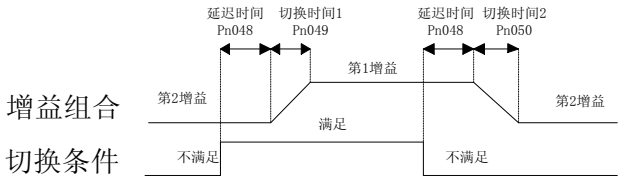
After replacing the battery, if the drive has an encoder alarm, please perform the Fn016 operation, reset the encoder alarm information, and then switch on the power drive again.

appendix

Appendix A gain switching

First gain		Second gain	
parameter	Name	parameter	Name
Pn153	Speed regulator proportional gain 1	Pn155	Speed regulator proportional gain 2
Pn154	Speed regulator integration time constant 1	Pn156	Speed regulator integration time constant 2
Pn192	Torque Q shaft regulator proportional gain 1	Pn194	Torque Q shaft regulator proportional gain 2
Pn193	Torque Q axis regulator integration time constant 1	Pn195	Torque Q axis regulator integration time constant 2
Pn196	Torque Q axis filter time constant 1	Pn197	Torque Q axis filter time constant 2
Pn115	Position regulator gain 1	Pn116	Position regulator gain 2

Note: when the gain is switched, it must be in the proper control mode, and the condition of setting parameters Pn0465 and Pn046 is appropriate to satisfy the gain switching condition and switch.



增益切换时序图

Appendix B control mode switching

B.1 Position / speed control mode switching

Using the control switch (Cmode), the position control mode and the speed control mode can be switched by inputting the control port SigIn contact.

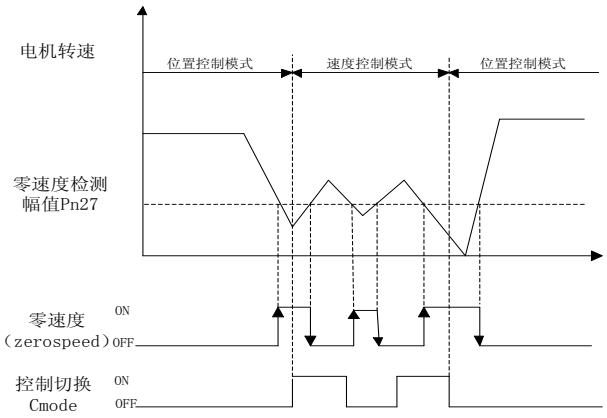
The relationship between the Cmode and the control mode is as follows.

Cmode	control mode
OFF	Position control mode
ON	Speed control mode

The control mode can be switched at zero speed state. But to be on the safe side, switch on when the servo motor is stopped. When the position control mode is switched to speed control mode, the hold pulse will be cleared. Before enabling the motor, please determine the control mode to be entered (the status of the Cmode pin). There are two modes of switching when the motor is enabled. The timing diagram is as follows:

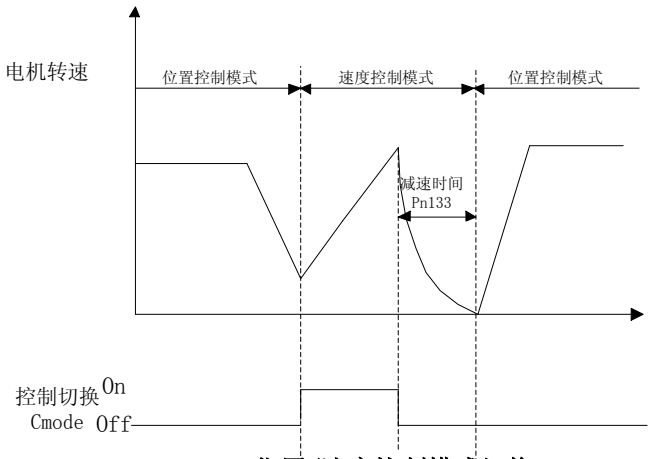
◢Pn132=0:

Only the zero speed state, switching signal change, mode switching is effective; if not in the zero velocity state, changed switching signal, then the signal into the zero velocity state, not mode switching.



位置/速度控制模式切换

◢Pn132=1:



位置/速度控制模式切换

B.2 Position / torque control mode switching

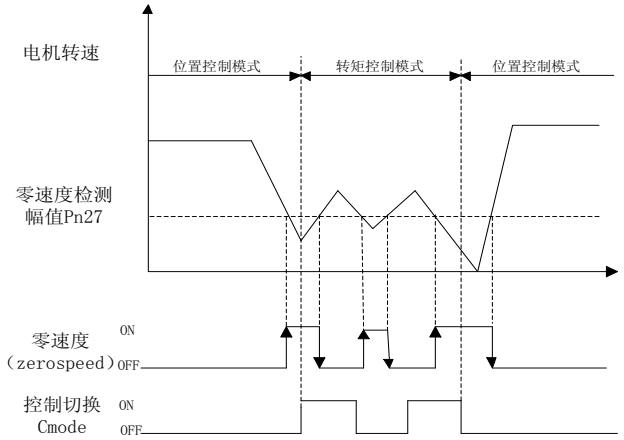
Using the control switch (Cmode), the position control mode and the torque control mode can be switched by inputting the control port SigIn contact. The relationship between the Cmode and the control mode is as follows.

Cmode	control mode
OFF	Position control mode
ON	转Torque control mode

The control mode can be switched at zero speed state. But to be on the safe side, switch on when the servo motor is stopped. When switching from position control mode to torque control mode, the hold pulse will be cleared. There are two modes of switching when the motor is enabled. The timing diagram is as follows:

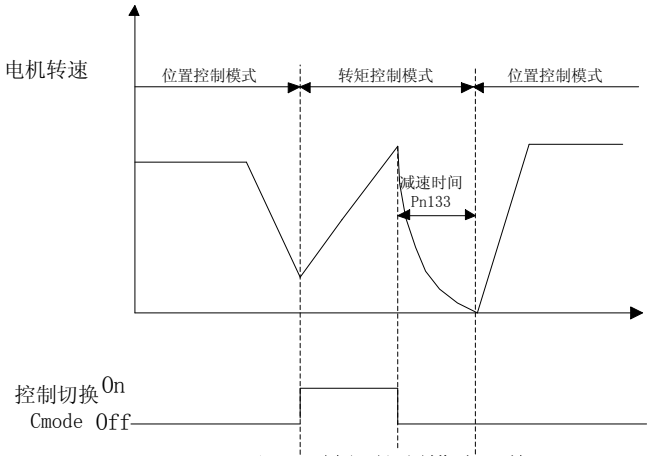
◢Pn132=0:

Only the zero speed state, switching signal change, mode switching is effective; if not in the zero velocity state, changed switching signal, then the signal into the zero velocity state, not mode switching.



位置/转矩控制模式切换

◢Pn132=1:



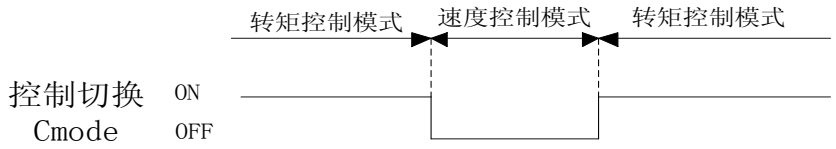
位置/转矩控制模式切换

B.3 Speed / torque control mode switching

The use of control switching (Cmode) allows the speed control mode and the torque control mode to be switched through the input control port SigIn contact. The relationship between the Cmode and the control mode is as follows.

Cmode	control mode
OFF	Speed control mode
ON	Torque control mode

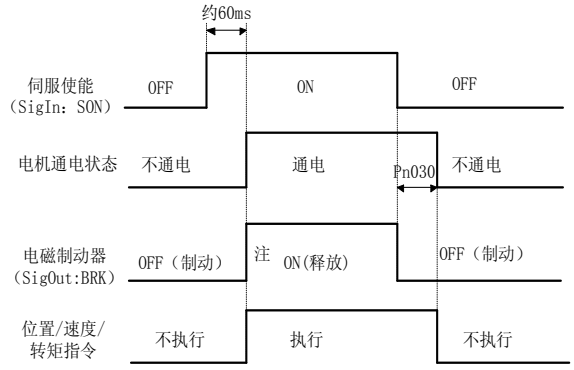
Whenever you can control the mode of switching, the timing diagram of the switch is as follows:



速度/转矩控制模式切换

Appendix C servo drive operation timing

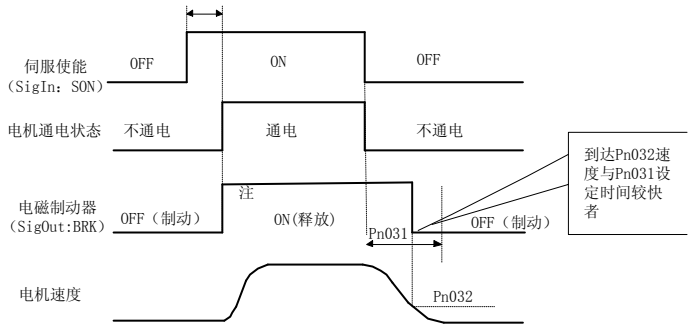
C.1 ON/OFF timing of motors at rest



Note 1: when using the electromagnetic braking function, the servo break enable mode Pn004 must be set to 2.

Note 2: when the motor speed is less than the parameter Pn029, the timing sequence of the electromagnetic brake.

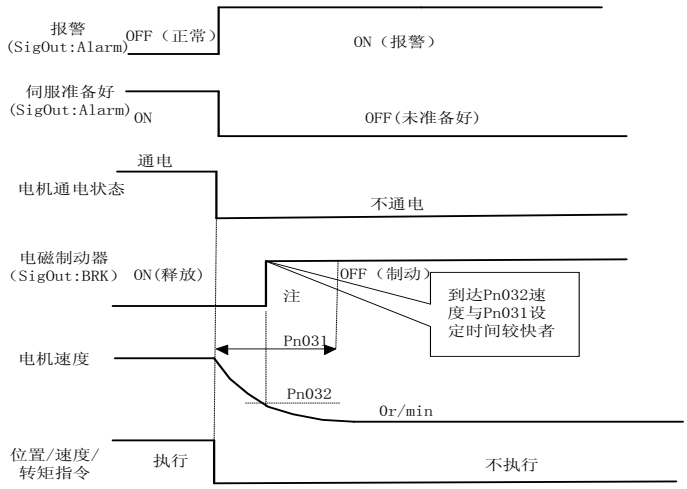
C.2 ON/OFF timing of motor operation



Note 1: when using the electromagnetic braking function, the servo break enable mode Pn004 must be set to 2

Note 2: when the motor speed is not less than the parameter Pn029 setting value, the electromagnetic brake sequence of action.

C.3 Timing of alarm when servo ON



Note 1: when using the electromagnetic braking function, the servo break enable mode Pn004 must be set to 2

Appendix D electromagnetic brake

An electromagnetic brake (holding a brake, an electric brake) used to lock a vertical or tilting table attached to the motor to prevent the bench from falling after the servo power is lost. To achieve this function, you must buy a motor with a brake. The brakes can only be used to maintain the table and must never be used to slow or stop motion.

Using the electromagnetic brake, you must set the Pn004 parameter to 2 and specify the function at the SigOut port. According to the rotation speed of the motor and the setting value of the parameter Pn029, the driver selects the corresponding braking sequence and performs the electromagnetic braking function. See the appendix C for specific timing.

Appendix E regenerative braking resistor

When the servo motor running in generator mode, power flow by the motor drive, known as renewable electricity. The following usage will cause the servo motor to operate in the generator (regenerative) mode:

(1) the servo motor moves from deceleration to stop during acceleration and deceleration operation.

(2) when applied to vertical loads.

(3) the servo motor is operated by the load end.

The regeneration power absorbed by the main loop filter capacitor drive, but renewable electricity is excessive, the filter capacitor can not afford, must use recycled to consume the excess electric resistance can be recycled. When the regenerative energy is too large, the internal braking resistance can not be absorbed completely, resulting in the occurrence of AL-03 (overvoltage), AL-08 (excessive temperature) or AL-16 (braking average power overload) and other alarms. According to the actual application, increase the acceleration and deceleration time, if still alarm, need external braking resistor, enhance the braking effect. External braking resistance range 40~200 ohm, power 1000~50W, the resistance is small, the greater the braking current, required braking resistance greater power, braking energy is larger, but the resistance is too low may cause damage to the drive, the test method is resistance from large to small, drive does not appear again until the alarm, running at the same time. The temperature is not too high to brake resistance. When the external braking resistor is removed, the internal regenerative braking resistor is removed. Because the resistance in the consumption of renewable power regeneration, will produce more than 100 C high temperature, please be careful, in connection with resistance wires use heat regenerative non flammable wire, and confirm the regeneration without touching anything resistance.

Note: when using regenerative resistor, if the alarm is generated, please cut off the power supply and cools down for a period of time. Due to a faulty regeneration transistor, the regenerative resistor is unusually hot and may cause a fire. Make sure to match the brake resistance according to the application.

Appendix F origin regression

F1. 1 Origin regression operation step

1:Reference point

Start the origin regression function, according to the first rate for the origin and the reference point, you can use the SigIn input terminal REF, CCWL or CWL as a reference point, you can also Z pulse as the reference point, can choose the forward or reverse direction finding.

2: find the origin

When the reference point is found, and then the second speed is used to find the origin, the Z or the pulse can be continued forward or backward, or the reference point can be used as the origin.

In order to avoid the mechanical impact caused by the drastic change of speed, the parameter Pn040 and Pn041 can be added to reduce the speed during the execution of the origin regression. The origin is found with the offset pulse as the actual origin, and the offset is: Pn036*10000+Pn037.

The origin regression reference point model (Pn034) and the origin model (Pn035) have the following combinations:

Pn034 / Pn035	0	1	2	3	4	5	6
0	√ (A)	√ (B)	√ (A)	√ (B)	×	×	×
1	√ (C)	√ (D)	×	×	×	×	×
2	√ (E)	√ (F)	×	×	√ (G)	√ (H)	√ (I)

The √ said the origin of the model combination will perform properly, ×said the origin of the model does not perform combination .

F1.2 **Origin regression trigger timing**

Pn033	Origin regression trigger mode	0: Turn off the origin regression function 1： riggered by the GOH level input by the SigIn 2： GOH edge triggered by SigIn input 3： Power up automatically once

●Level triggered (Pn033=1)

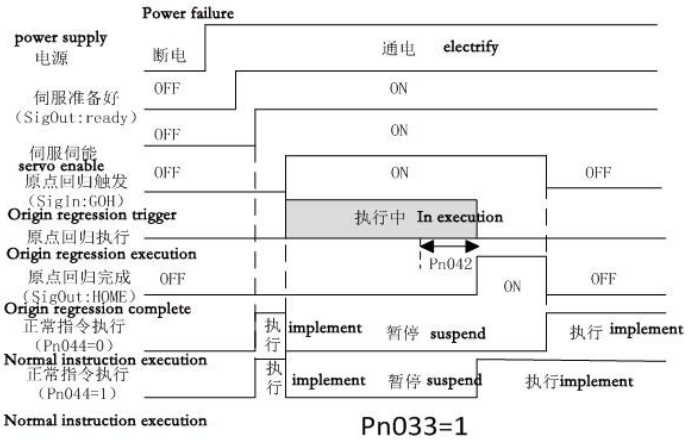
After servo enable, the input terminal GOH triggers the origin return execution, and the GOH starts the return operation on the top side, stops the normal instruction execution, and the lower edge ends the return operation. GOH keeps ON, and when the execution is complete, the position offset is cleared (position control), and the output terminal HOME becomes ON. Until GOH becomes OFF, then HOME becomes OFF.

When Pn044=0, when the origin return is complete, wait for the GOH signal to change to OFF and then execute the instruction. During the waiting period, the motor stays at the origin and does not accept the instruction.

When the Pn044=1 is returned, the command is executed immediately after the origin return is completed.

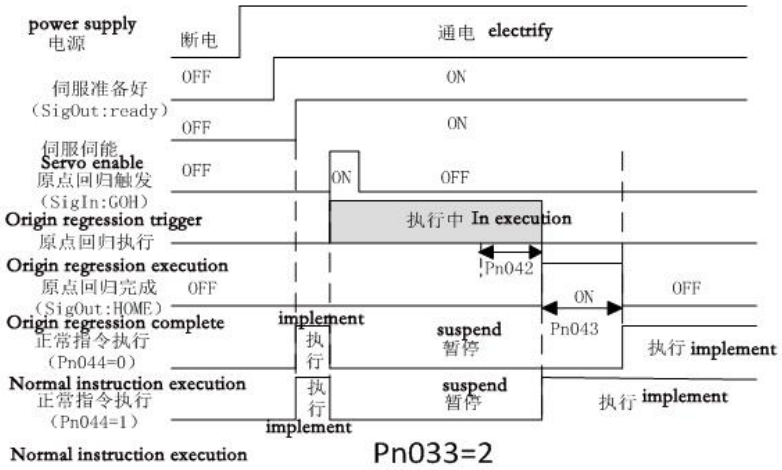
In origin return execution, if the servo is enabled, the son is enabled, any alarm is generated, and the GOH is advanced to OFF, the origin regression function is aborted and the output terminal HOME is not operative. In

addition, if the son effective, no alarm, return in the execution and no complete, even if the edge triggered (Pn033=2) signal repetition effectively, the drive will return after completion of the current operation, then the trigger signal edge detection.



●Edge triggered (Pn033=2)

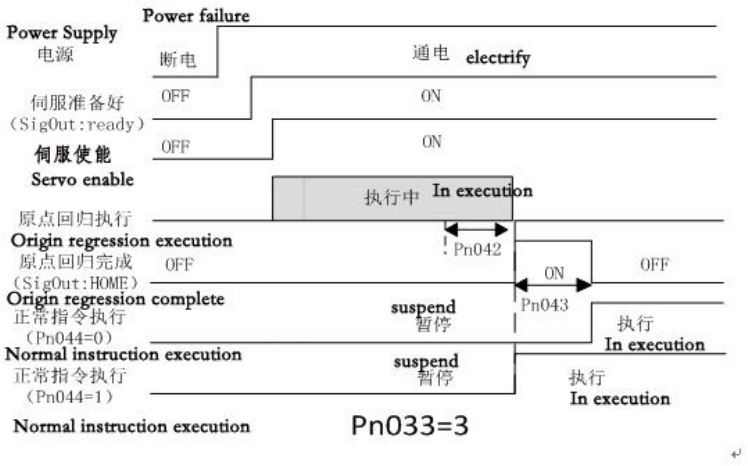
After servo enable, the input terminal GOH rises, triggers the origin return execution, and pauses the normal



instruction execution

●Power on automatic execution (Pn033=3)

This function is only performed once the power is on, the servo is first valid, and then the origin return is not repeated. Each time the power is turned on, the drive automatically performs an origin return operation. With this feature, you can save an input terminal GOH.



F1.3 Origin regression, combination model, time series

Pn034	Origin regression reference point mode	0:The REF is turned (triggered by the rising edge) as the reference point 1: reverse, find REF (rising edge trigger) as reference point 2: is turning to CCWL (triggered by the falling edge) as the reference point 3: reverse for CWL (falling edge triggered) for reference 4: is looking for the Z pulse as the reference point 5: reverses the Z pulse for reference points 6: absolute zero as reference point (valid only for absolute encoder)	0~6	0
Pn035	Origin regression origin mode	0: back to the Z pulse as the origin 1: look for the Z pulse as the origin 2: take the rising edge of reference point as the origin directly	0~2	0

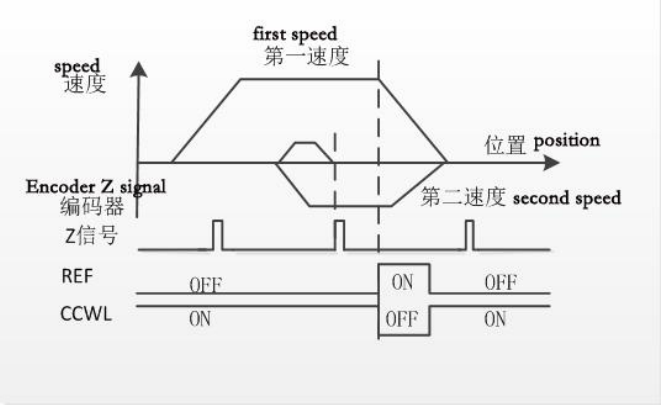
Note 1: by combining parameter Pn034 and Pn035, there are 8 available origin return methods.

Note 2: when the origin returns operation, the positive / reverse drive disable is turned off until the regression operation is exited.

(A)Pn034=0 or 2,Pn035=0

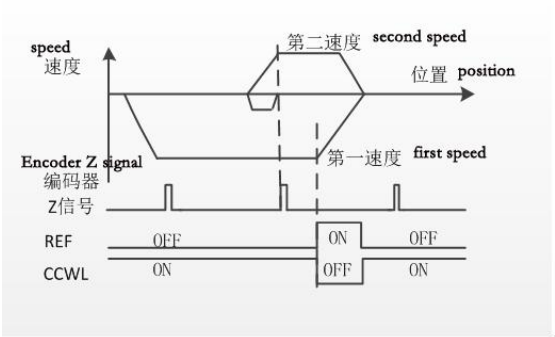
parameter	Setting	instruction
Pn034	0 or 2	After the origin regression starts, the first speed is turned to REF (rising edge triggered) or CCWL (triggered by the falling edge) as the reference point

Pn035	0	After arriving at the reference point, the Z pulse is returned to the origin at the second speed of the return



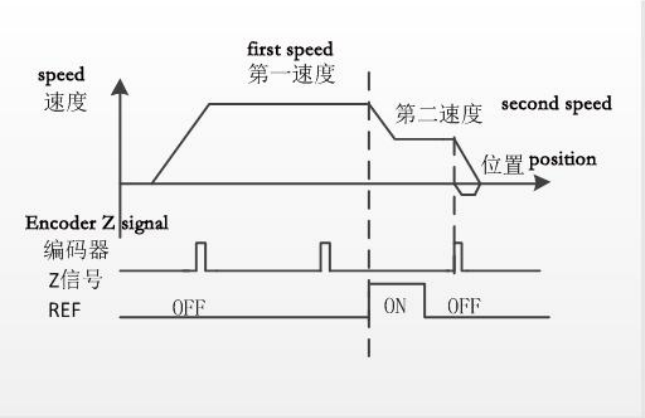
(B)Pn034=1 或 3,Pn035=0

parameter	Setting	instruction
Pn034	1 or 3	After the origin regression is started, the first speed inversion is used to find the REF (rising edge triggered) or CWL (triggered by the falling edge) as the reference point
Pn035	0	After arriving at the reference point, the Z pulse is returned to the origin at the second speed of the return



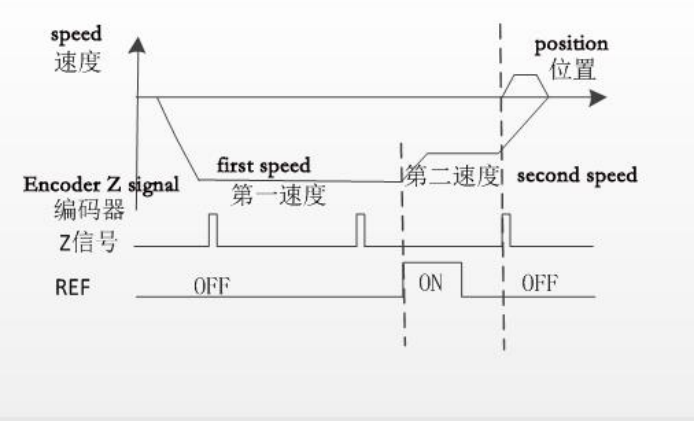
(C)Pn034=0,Pn035=1

parameter	Setting	instruction
Pn034	0	After the origin of the regression start, the first speed is transferred to the REF (rising edge trigger) as the reference point
Pn035	1	After arriving at the reference point, forward the Z pulse at the return second speed as the origin



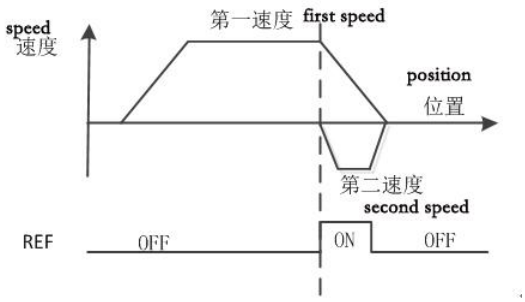
(D)Pn034=1,Pn035=1

parameter	Setting	instruction
Pn034	1	After the origin regression starts, the REF (rising edge trigger) is used as the reference point according to the first speed inversion of the regression
Pn035	1	After arriving at the reference point, forward the Z pulse at the return second speed as the origin



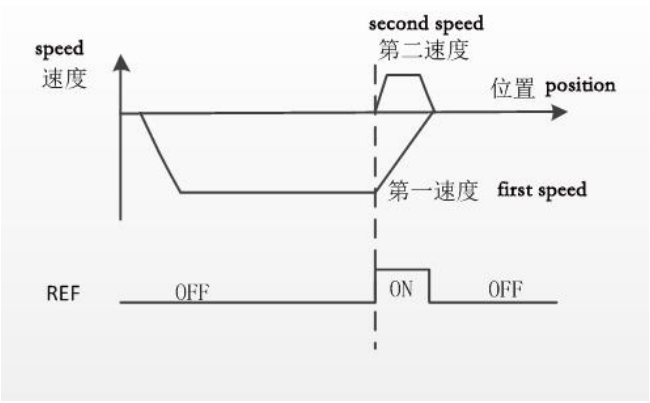
(E)Pn034=0,Pn035=2

parameter	Setting	instruction
Pn034	0	After the origin of the regression start, the first speed is transferred to the REF (rising edge trigger) as the reference point
Pn035	2	When the reference point is reached, the reference point is used as the origin point



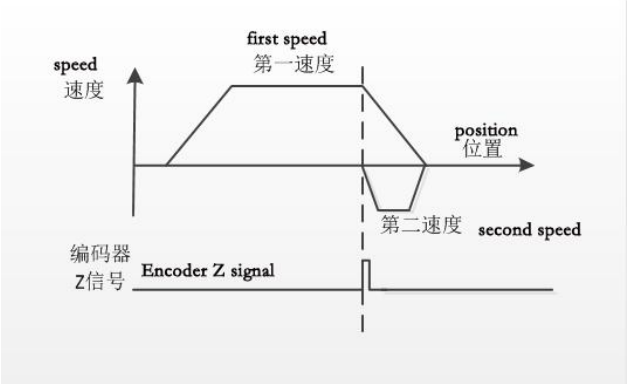
(F)Pn034=1,Pn035=2

parameter	Setting	instruction
Pn034	1	After the origin regression starts, the REF (rising edge trigger) is used as the reference point according to the first speed inversion of the regression
Pn035	2	When the reference point is reached, the reference point is used as the origin point



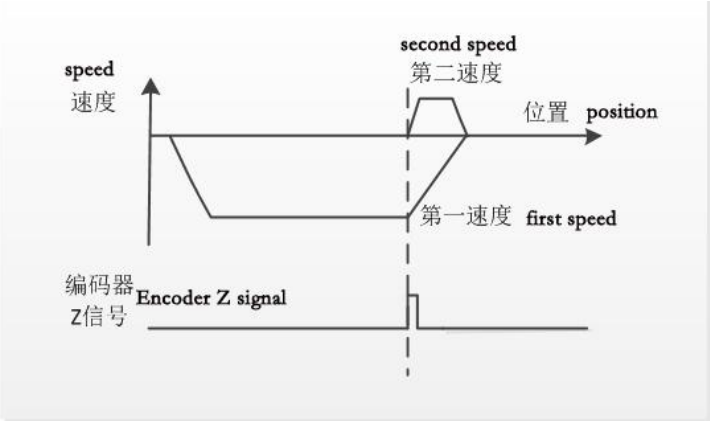
(G)Pn034=4,Pn035=2

parameter	Setting	instruction
Pn034	4	After the origin regression starts, the Z pulse is turned to the reference point according to the first speed of the regression
Pn035	2	When the reference point is reached, the reference point is used as the origin point



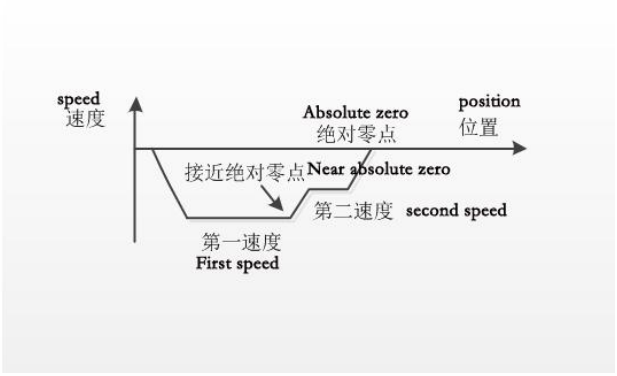
(H)Pn034=5,Pn035=2

parameter	Setting	instruction
Pn034	5	After the origin regression is started, the Z pulse is selected as the reference point according to the first speed reversal of the regression
Pn035	2	When the reference point is reached, the reference point is used as the origin point



(I)Pn034=6,Pn035=2

parameter	Setting	instruction
Pn034	6	The absolute zero of the absolute motor is used as the reference point
Pn035	2	When the reference point is reached, the reference point is used as the origin point



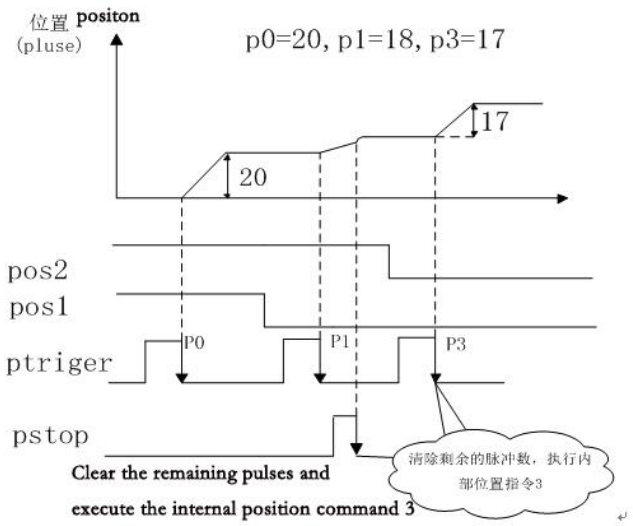
Appendix G internal position control

For internal position control, you need to set Pn002=2, Pn117=1, and set the corresponding running parameters in Pn118~Pn131. The SigIn port pos1, pos2 selects the internal location command N:

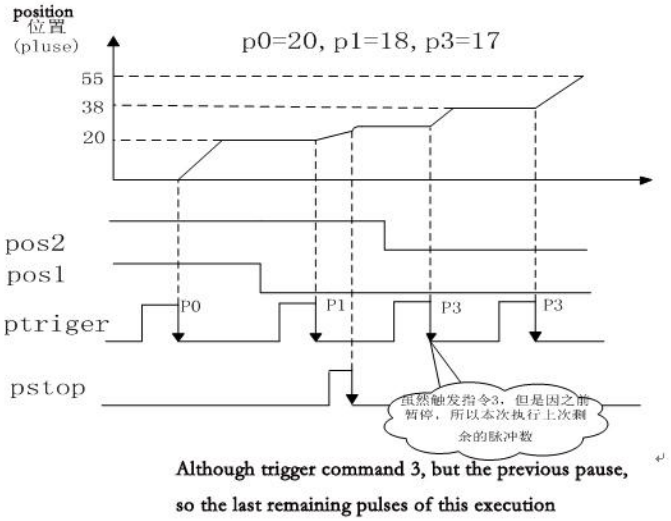
Pos2	Pos1	NInternal location command N
Off	Off	Internal location command 0
Off	On	Internal location command 1
On	Off	Internal location command 2
On	On	Internal location command 3

The use of internal position control, first determine the input port pos1, pos2 state, choose the corresponding internal position command, and then trigger input signal ptriger, each ptriger (OFF->ON) decreased when the driver reads the internal position command N, accumulated to the remaining instruction pulse number, to continue the implementation of the corresponding operation.

If you set the Pn118=0, want to pause the motor running in the location process, when the trigger input pstop signal, motor deceleration stop, then drive automatically remove the remaining position command, when the input port of the ptriger trigger, the driver will be based on the current state of pos1, pos2, executive position instruction, please refer to the following sequence diagram:



If you set the Pn118=1, suspension of motor running in the location process, when the trigger signal input port pstop, motor deceleration stop, when the input port of the ptriger trigger, the motor will continue to walk the remaining position command, arrived at the input port pstop trigger issued before the target position, please refer to the following sequence diagram:

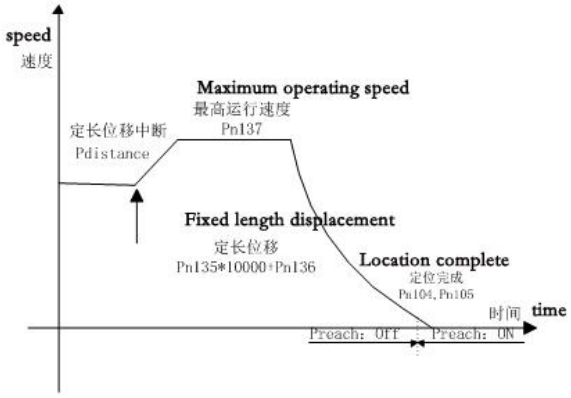


Appendix H fixed length displacement interruption

The parameters of fixed length displacement are as follows:

Pn134	Fixed length displacement direction	0~1	0		P
Pn135	Fixed length shift height	0~9999	0	Tens of thousands	P
Pn136	Fixed length shift low	0~9999	100	individual	P

Pn137	Maximum running speed at fixed length	5~5000	200	r/min	P
Pn138	Fixed length locking release	0~1	1		P



Fixed length displacement discontinuity refers to the motor is in stop mode or in position control mode, the SigIn:Pdistance input signal edge effectively, the motor will speed according to the original direction (Pn134) mobile specific distance (Pn135*10000+Pn136). During the execution of fixed displacement,

The servo is in a fixed length shift lock position and will ignore other position instructions (including Pdistance and Punlock trigger signals). When the fixed length is completed

After the distance meets the position completion condition (Pn104, Pn105), the SigOut: Preach port signal output changes to On state. Thereafter, the drive performs the corresponding unlock mode in accordance with the setting of the lock release (Pn138) method. If Pn138 is 0, the position response is immediately answered after completion of the position; if Pn138 is 1, the lock state is unlocked only after the input port SigIn:Punlock signal edge is valid, in response to the position command. The port signals of SigIn:Pdistance, Punlock and SigOut:Preach should be set in Pn052~Pn063 and other parameters.

Note 1: position completion parameter Pn104, the greater the Pn105 setting, the earlier the Preach signal becomes the On state, but does not affect the final positioning accuracy in the locked state. If the preach signal changes to the On state, a smaller fixed displacement error is obtained, which reduces the Pn104, Pn105 parameter values, or waits for the motor to remain stationary.

Note 2: position command acceleration / deceleration (Pn109) must be set to 0.