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YMPC Ichikawa Electric V 6.3

A1 Series Servo Motor Driver

technical manual

Safety Precautions

In order to ensure the safe use of this product, the following safety signs must be followed to avoid injury to personnel and damage to equipment.

	Indicates that mishandling may cause a hazard that may result in minor or moderate personal injury, damage to equipment, or even to cause a fire.
	Indicates a hazard that could result in injury or death if mishandled.
	Indicates that an operation is prohibited.
	Indicates that an action is required.

After the product arrives, when confirming, installing, wiring, operating and maintaining, and inspecting, the following are important items that must be observed:

● Precautions during installation:


It is strictly forbidden to install in a humid and corrosive environment, an environment with flammable gases, near combustibles, and an environment with a lot of dust and metal powder, otherwise electric shock and fire may occur.

● Precautions for wiring:


◢ The ground terminal of the servo drive must be grounded, otherwise, electric shock and fire may occur. ◢ It is strictly forbidden to connect the output terminals U, V, W of the servo drive to the three-phase power supply, otherwise, injury or fire may occur. ◢ It is strictly forbidden to connect the 220V driver to the 380V power supply, otherwise it may cause electric shock and fire. ◢ Be sure to tighten the power terminals and motor output terminals, otherwise it may cause a fire.

● Precautions during operation:


◢ During operation, it is strictly forbidden to touch any rotating parts, otherwise it may cause injury. ◢ During operation, it is strictly forbidden to touch the motor and driver, otherwise it may cause burns.

◢ Before operation, the correct motor model must be selected, otherwise personnel may be injured and equipment may be damaged.

◢ Before running, the user parameters suitable for the application must be set, otherwise it may be injured and the equipment may be damaged.

◢ Before running, confirm whether the machine can be stopped in an emergency at any time, otherwise, you may be injured.

● Precautions for maintenance and inspection:

◢ It is strictly forbidden to touch the inside of the servo drive, otherwise there may be electric shock.

◢ After turning off the power, it is strictly forbidden to touch the terminals within 5 minutes, otherwise, the residual voltage may cause electric shock.

◢ It is strictly forbidden to disassemble the servo motor, otherwise there may be electric shock.

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No.1Chapter Product Inspection and Installation

1.1product inspection

This product has undergone a complete functional test before leaving the factory. In order to prevent the product from being abnormal due to negligence during product delivery, please check the following items in detail after unpacking:

- Check whether the servo drive and servo motor models are the same as those ordered.
- Check the appearance of the servo driver and servo motor for damage and scratches. In case of damage during transportation

  Do not wire to send electricity.
- Check the servo driver and servo motor for loose parts. Are there any loose screws, yes

  No The screws are not fastened or fall off.
- Check that the rotor shaft of the servo motor can be rotated smoothly by hand. A motor with a brake cannot rotate directly.

If the above items break down or have abnormal phenomena, please contact the dealer immediately.

1.2Drive Specifications

input power		①single phase or three phaseAC220V -15~+10% 50/60Hz ② Single-phase or three-phaseAC380V -15~+10% 50/60Hz
environment	temperature	Work:0~55℃Storage:-20℃~80℃
	humidity	less than90%(no condensation)
	vibration	less than0.5G(4.9m/S^2),10~60Hz(non-continuous operation)
control method		IGBT PWM sine wave control
control mode		① Torque mode (internal or external) ④ Position/speed mode ② Velocity mode (internal or external) ⑤ Position/torque mode ③ Position mode (internal or external) ⑥ Speed/torque mode
control input		Servo enable, alarm reset, forward drive prohibition, reverse drive prohibition, External forward torque limit, external reverse torque limit, emergency stop, Zero speed clamp, internal speed command selection1, internal speed command selection2 Internal speed command selection3, internal torque command selection1, Internal torque command selection2, control mode switching, gain switching, Electronic Gear Molecular Selection1, Electronic gear molecular selection2, Instruction Negation, Position deviation clear, pulse input prohibition, proportional control, origin return trigger, Home return reference point, internal position selection1, internal location selection2, Trigger internal position command, suspend internal position command, internal and external position command selection Fixed-length displacement interrupt, fixed-length unlock
control output		Alarm detection, servo ready, emergency stop detection, positioning complete, Speed arrival, arrival of predetermined torque, zero speed detection, power on of servo motor, Electromagnetic braking, homing completion, positioning approach, torque limit, speed limit, Track torque command arrival
encoder feedback		①2500 line incremental encoder ② 17-bit absolute encoder
way of communication		①RS-232②RS-485
Display and operation		①5bitledshow②4/5keys
braking method		Dynamic braking through built-in/external braking resistor
cooling method		Air cooling (heat conduction mold, high-speed forced cooling fan)
power range		⩽10KW

1.3Servo motor installation

Installation environment conditions

- Working environment temperature: 0～40℃; working environment temperature: below 80% (no condensation).
- Storage environment temperature: -40～50℃; storage environment humidity: below 80% (no condensation).
- Vibration: below 0.5G.
- A well-ventilated place with little humidity and dust.
- No corrosive, flammable gas, oil gas, cutting fluid, iron powder and other environments.
- A place free from water vapor and direct sunlight.

installation method

- Horizontal installation: In order to prevent liquids such as water and oil from flowing into the motor from the outlet end of the motor, please place the cable outlet at the bottom.
- Install vertically: If the motor shaft is facing upwards and a reducer is attached, attention must be paid to prevent oil stains in the reducer from penetrating into the motor through the motor shaft internal.
- The extension of the motor shaft must be sufficient, if the extension is insufficient, it will easily cause vibration when the motor moves.
- When installing and removing the motor, do not hit the motor with a hammer, otherwise it will easily cause damage to the motor shaft and encoder.

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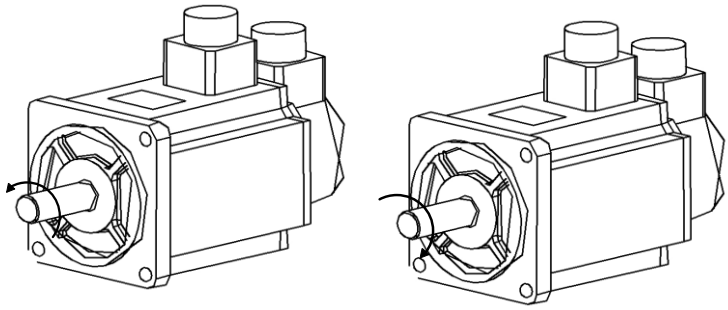
1.4Motor rotation direction

Viewed from the load end of the motor, the motor shaft extension rotates counterclockwise (CCW) for positive rotation, clockwise rotation (CW) for inversion.



Forward(CCW) reverse (CW)

1.5The servo unit is compatible with the motor model

220VThe driver model and motor model matching table are as follows:

motor model	Pn001	Rated speed (r/min)	Rated torque (NM)	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	twenty one	1000	10	1	√	√	√		
130st_m10015	twenty two	1500	10	1.5		√	√		
130st_m10025	twenty three	2500	10	2.6			√	√	√
130st_m15015	twenty four	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	twenty three	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 matching table of 380V driver model and motor model is as follows:

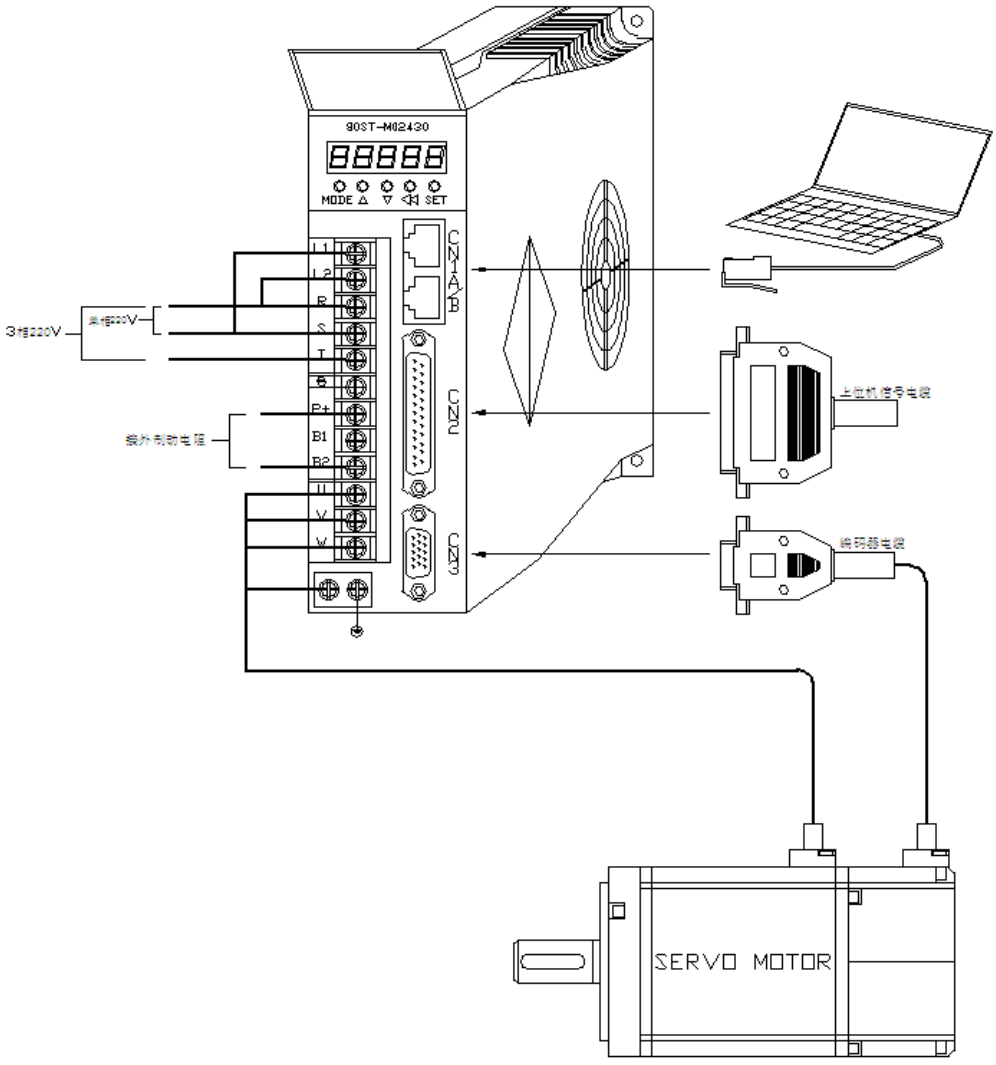
motor model	Pn001	Rated speed (r/min)	Rated torque (NM)	rated power (KW)	KRS 25	KRS 40	KRS 50	KRS 75
180st_m48020	46	2000	48	10			√	√
180st_m19020	47	2000	19	4		√	√	√
180st_m35020	48	2000	35	7.3		√	√	√
180st_m27020	49	2000	27	5.6		√	√	√

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.2Chapter Wiring

2.1System Composition and Wiring

2.1.1 A1Servo drive wiring diagram



2.1.2Wiring Instructions

Wiring precautions:

- The wiring material is used according to the wire specification.
- Cable length, command cable3mWithin, the encoder cable20mwithin.
- 220vDriver powerL1,L2,L3Whether the power wiring is correct, please do not connect380Vpower on.
- The phase sequence of motor output terminals U, V and W must correspond to the corresponding terminals of the motor one by one. If the connection is wrong, the motor may not turn or fly, and the motor may be damaged.

  bad drive. The motor cannot be reversed by exchanging the three-phase terminals, which is completely different from the asynchronous motor.
- It must be reliably grounded and single-point grounded.
- For the relay installed in the output signal, the direction of the absorbing diode must be connected correctly, otherwise it will cause failure and fail to output the signal.
- In order to prevent erroneous operation caused by noise, please add insulation transformer and noise filter to the power supply in the same wiring duct.
- Please install a non-fuse circuit breaker so that the external power supply can be cut off in time when the drive fails.

2.1.3Wire Specifications

connection terminal	symbol	Wire Specifications
power cable	U, V, W	0.75～2.5mm²
Motor connection terminal		0.75～2.5mm²
Ground terminal		0.75～2.5mm²
Control signal terminal	CN2	⩾**0.12**mm²(AWG26), including shielded wire
Encoder signal terminal	CN3	⩾**0.12**mm²(AWG26), including shielded wire

Encoder cables must use twisted pairs. If the encoder cable is too long (>20m), it will lead to insufficient power supply of the encoder, its power supply and ground wire

Multi-wire connections or thick wires can be used.

2.1.4Description of strong current terminals

● Drive terminals

name	Terminal symbol	Detailed description
Main circuit power	R,S,T	Connecting to external AC power three-phase220VAC - 15%~+10% 50/60Hz
Control Circuit Power	L1,L2	Connecting to External AC Power Three-phase 220VAC -15%～+10% 50/60Hz
Braking resistor terminal	B1,B2,P+	If the internal braking resistor is used, B2 and B1 must be short-circuited; If an external braking resistor is used, B2 and B1 must be removed Connect the wiring between the terminals, install the braking resistor and connect it to B2, B+ terminals.
Motor connection terminal	u	output to motoruphase power
	V	output to motorVphase power
	W	output to motorWphase power
Ground terminal		Motor case ground terminal
		Drive ground terminal

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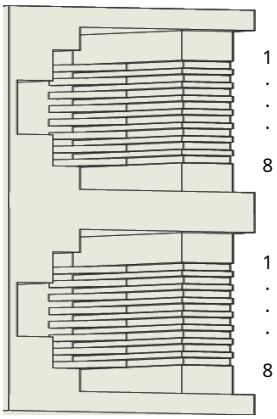
2.2 CN1Communication Interface

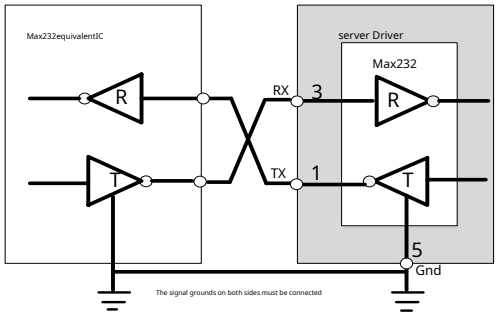
2.2.1 CN1port signal definition



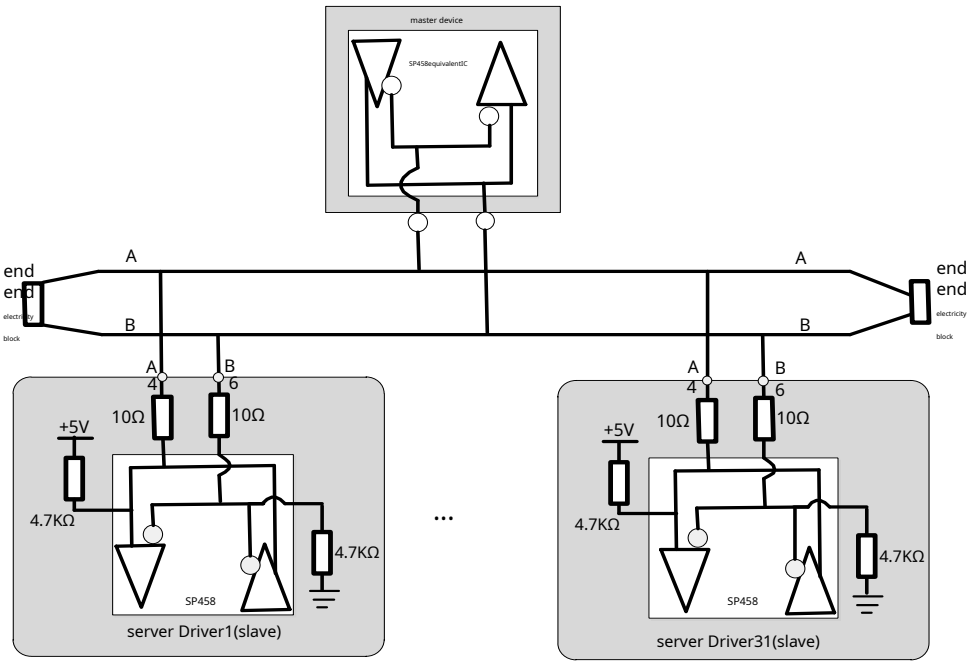
name	pin number	Function
RS485+	1	RS-485A
null	2	
RS485-	3	RS-485B
RX232_TX	4	RS-232 sender
RX232_RX	5	RS-232 receiver
GND	6	land
FG	7	Outer shell
+5V	8	5V

2.2.2 CN1port type

1. RS-232interface



2. RS-485interface



● useRS485When communicating, the maximum number of simultaneous connections31a servo driver,485The end of the network needs to be connected to one120Ohm resistor terminal resistance. If you want to connect more devices, you must use a repeater to expand the number of connected units.

2.3 CN2control interface

CN2The control signal terminal provides the signal required to connect with the upper controller, useDB25CanDB44Sockets, signals include:

● 4programmable inputs (standard version),10programmable input (advanced version);

● 4programmable outputs (standard version),5Programmable output (advanced version);

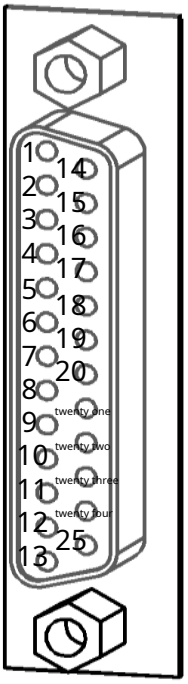
● Analog command input;

● Pulse command input;

● Encoder signal input;

● Encoder frequency division output signal;

2.3.1 CN2port signal definition

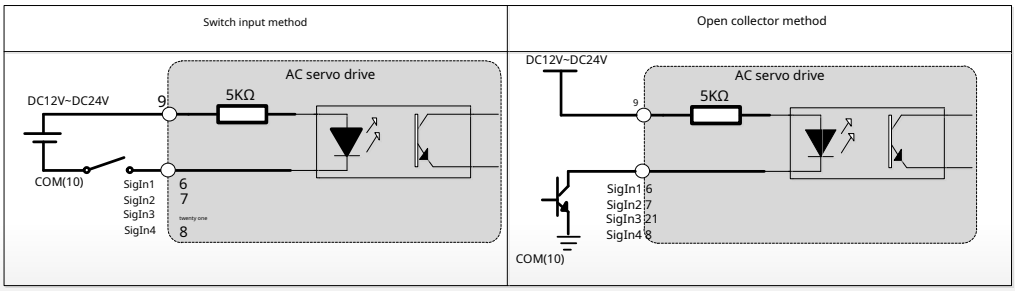


pin	interface number	name	Function
DC12~24V	9	electrical control signal	Input power supply for input and output control signals
COM	10	source and place	peacefully
SigIn1	6	input command signal	Input port function (configurable):
SigIn2	7		SigIn1:Servo enable
SigIn3	twenty one		SigIn2:alarm reset
SigIn4	8		SigIn3:Position deviation clear
			SigIn4:Pulse input prohibited
SigOUT1	11	output command signal	Output command signal. Each input at the factory
SigOUT2	twenty three		The function specified by the output signal port:
SigOUT3	12		SigOUT1: servo ready
SigOUT4	twenty four		SigOUT2: Alarm detection
			SigOUT3: positioning complete
			SigOUT4: Emergency stop detection
PV	2	command pulse input	PV:Open collector input power command
PP+	3	port	Pulses can be input in three different ways:
PP-	14		1: command direction and pulse input
PD+	4		2: clockwise/counterclockwise pulse input
PD-	5		3: phase difference90degree of quadrature pulse input
			enter
PA+	20	Encoder signal output	Encoder signal (ABZ) output port.
PA-	19	out	By parameter setting,ABSignal can be divided
PB+	18		output and logic inverted output.
PB-	17		
PZ+	15		
PZ-	16		
OZ	twenty two		
GND	1		
Vref	25	analog input	Analog voltage input port. speed or force
AGND	13		In torque control, it is used to receive speed or force
			torque command. Voltage input range
			- 10V~+10V.

2.3.2 CN2port type

1.digital input interface

The digital input interface circuit can be controlled by switches, relays, open-collector transistors, photocouplers, etc. The relay needs to select the low Current relays to avoid poor contact. External voltage rangeDC12V~24V.



2.Digital output interface

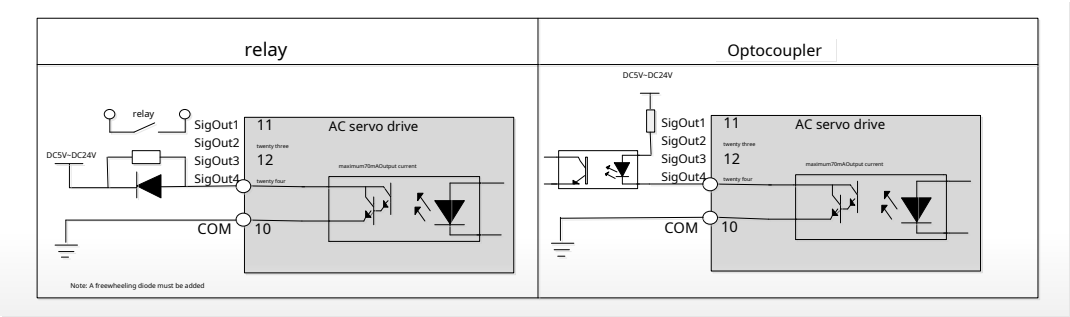
The output circuit adopts Darlington optocoupler, which can be connected with relay and optocoupler.

Precautions:

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

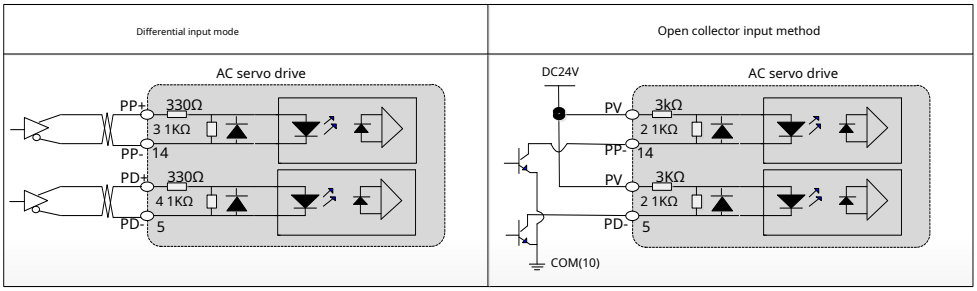
● The output is in the form of open collector, the maximum current70mA, the maximum voltage of the external power supply25V. If the limit is exceeded or the output is directly connected to the power connection, it may cause damage to the servo drive.

● If the load is an inductive load such as a relay, a freewheeling diode must be connected in antiparallel to both ends of the load. If the freewheeling diode is reversed, it may cause The servo drive is damaged.



3.Position pulse command interface

There are two connection methods of differential drive and single-end drive, and the differential drive connection is recommended. Twisted pair wires should be used for wiring.



● In differential input mode, it is recommended to useAM26LS31Similar to a line driver chip; in order to make the transmitted pulse data have good anti-interference ability, Differential drive is recommended; the maximum input pulse frequency550kHz(kpps).

● In the open-collector input mode, the maximum input pulse frequency200kHz(kpps).

4.Encoder signal differential drive output

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

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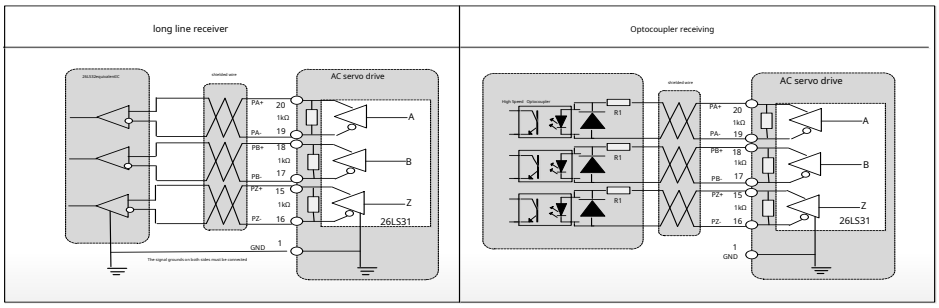
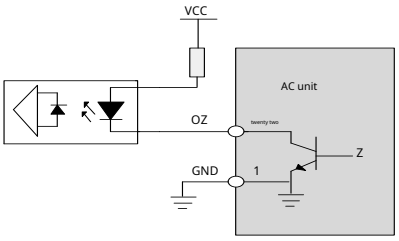


● When the long-line receiver receives, the drive encoder signal ground (GND)It must be connected to the signal ground of the host controller.

● When the optocoupler is receiving, the host controller uses a high-speed optocoupler (such as6N137), the value of current limiting resistor R1220Ωabout.

5.EncoderABZ signal open collector output

The servo driver outputs the encoder'sABZSignal. becauseZThe pulse width of the signal is narrow, please use a high-speed photocoupler to receive it on the host computer.

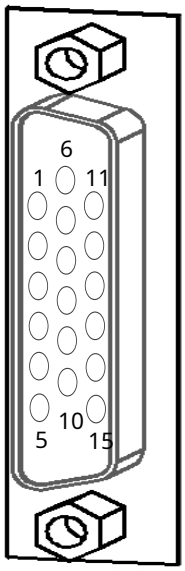


● VCCmaximum voltage30V, output current max.50mA.

● Only the advanced version of the servo unit supportsA,BSignal open collector output function.

2.4 CN3Encoder interface

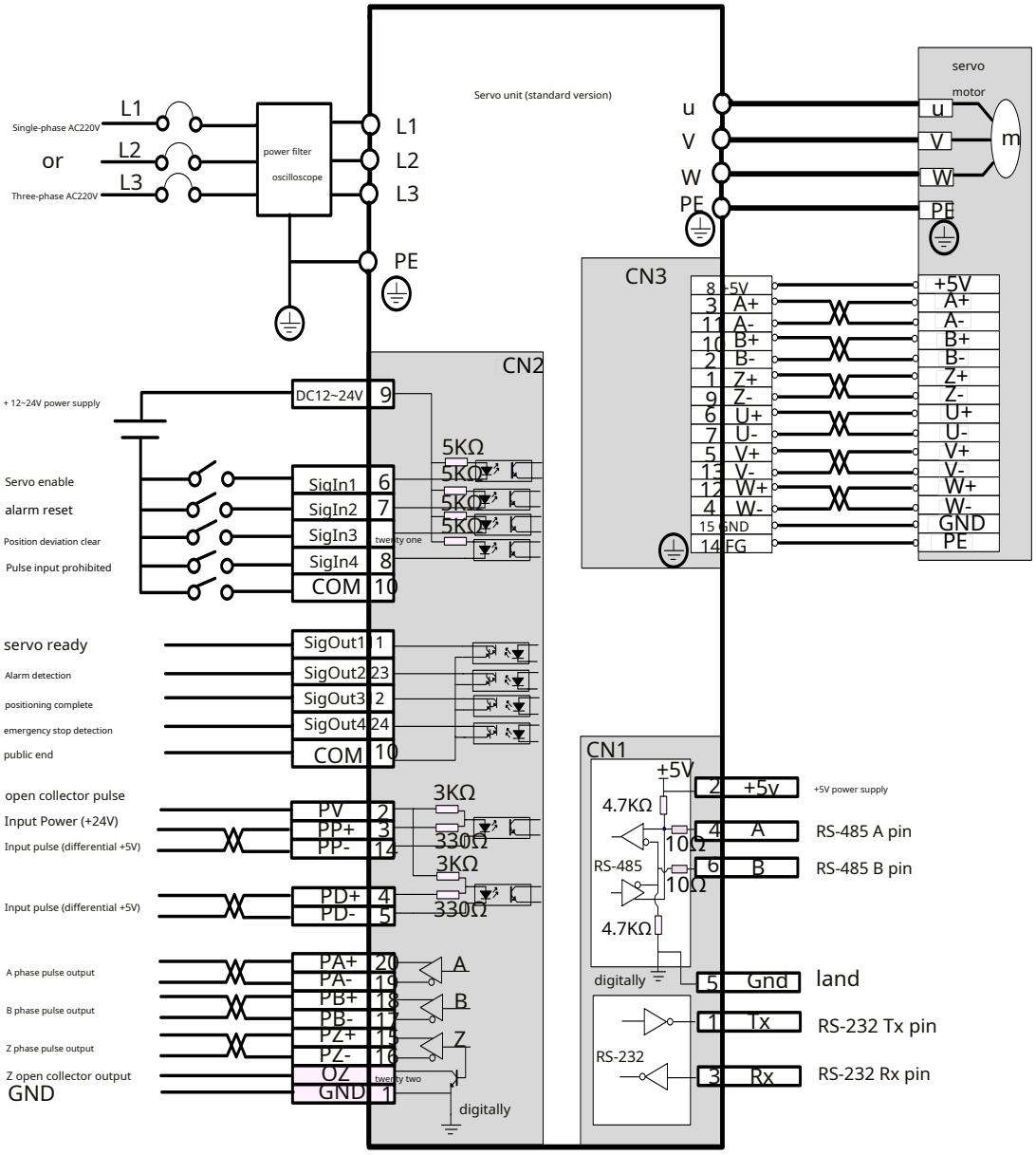
2.4.1 CN3Encoder signal definition



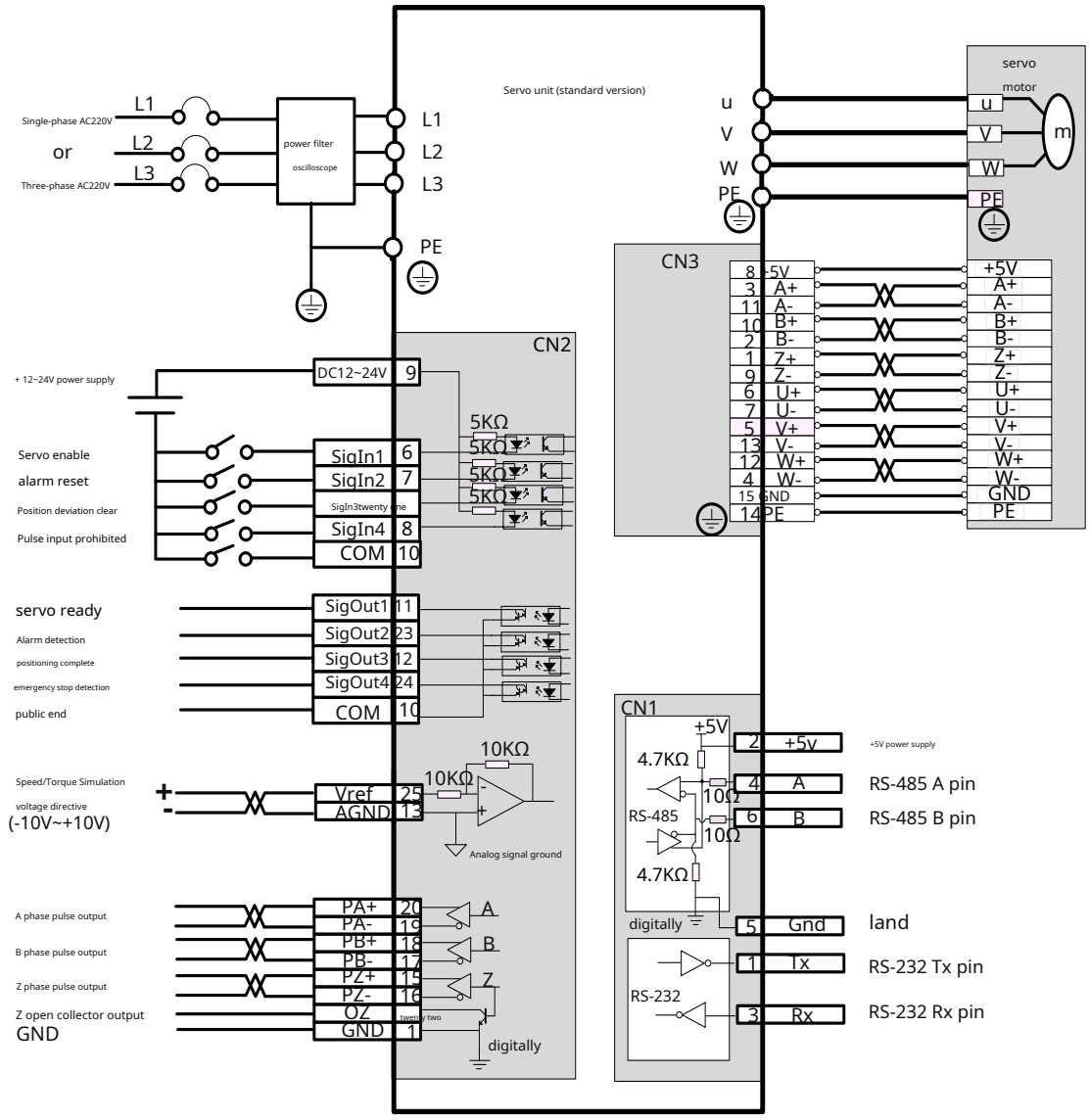
encoder type	pin number	name
Incremental	1	A+
	2	A-
	3	W+
	4	V-
	5	U+
	6	Z+
	7	B-
	8	W-
	9	U-
	10	+5V
	11	Z-
	12	B+
	13	V+
	14	FG
	15	GND
Absolute	6	SD+
	11	SD-
	14	FG
	15	GND

2.3standard wiring

2.3.1Position control wiring diagram



2.3.2Speed/Torque Control Wiring Diagram



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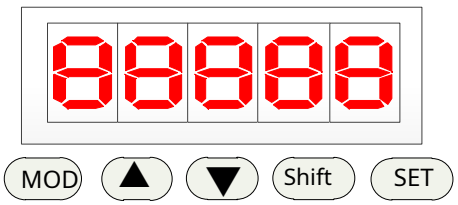
No.3Chapter Display and Operation

3.1panel composition

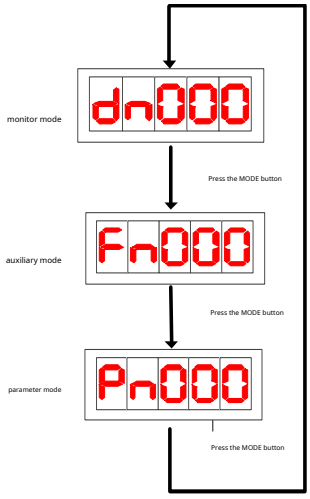
3.1.2Display and Keys



button	button name	Function
MODE	mode selection key	1mode switch 2Return to parent directory
▲	number increase key	Increase the number, long press has a repeat effect
▼	number down key	Decrease the number, long press has a repeat effect
Shift	shift key	cursor shift
SET	OK key	1confirm settings 2End parameter setting

Note: If all the 5 decimal points on the display are flashing, an alarm is generated. The drive can work normally only after the alarm has been cleared.

3.2mode change

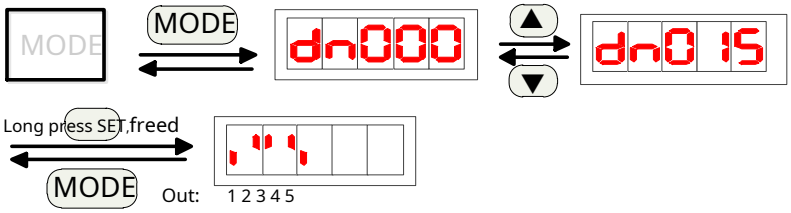


Note: When the display showsFnxxx,Dnxxx,PnxxxAt this time, it is in the top-level directory,modeThe key is the mode switching function, which can be directly

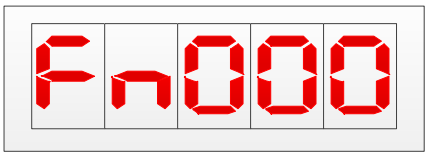
It mode switches, otherwisemodeThe key is the function of returning to the upper directory.

3.3monitor mode (Dn)operate

Example: viewdn015No. monitoring parameters, at this timesigOut1,sigOut5port is low,sigOut2, sigOut3, sigOut4Port is high power flat.



3.4Auxiliary mode (Fn)operate



auxiliary mode function number

● Accessibility list

serial number	illustrate
Fn000	Alarm record query
Fn001	User parameters are permanently written. If the user is rightPn000~Pn280The parameters in are set, for the next power-on, the drive If the driver loads the parameters modified by the user, this operation must be performed to write the parameters into the internalEEPROMchip. perform exercises After doing it, you need5Seconds or so, write all parametersEEPROMmiddle.
Fn002	JOGTrial operation
Fn003	Clear the currently detected alarm
Fn004	will be in the parameter tablePn000~Pn280parameters, according toPn000The settings will be restored to the factory defaults.
Fn005	Clear position deviation
Fn006	SigOutThe port is forced to output, and the forced state is only valid under this operation. 0:SigOutAll ports are unforced. 1:SigOutAll ports are forced to output high level. 2:SigOutAll ports are forced to output low level.
Fn007	Analog torque command voltage correction
Fn008	Analog speed command voltage correction
Fn009	bus voltage correction
Fn010	temperature correction
Fn011	Alarm log initialization
Fn012	Encoder zeroing
Fn015	Absolute encoder multi-turn data reset to zero
Fn016	Absolute encoder alarm reset
Fn018	Load inertia estimation

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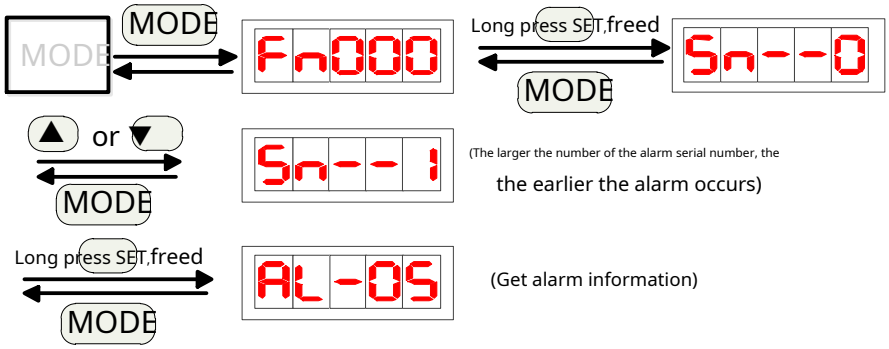
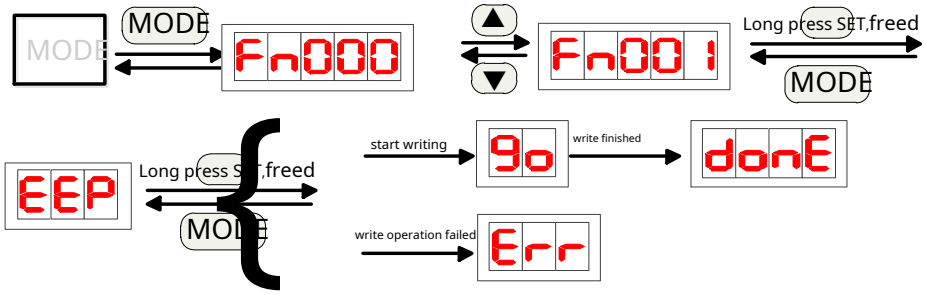
3.4.1.1Fn000Alarm function query



3.4.1.2Fn001User parameters are permanently written



illustrate1: If the last operation shows  , it may be that the drive is performing data writing operations, please wait for a few seconds and try again.

illustrate2: You must wait for the writing to be completed before turning off the power, otherwise, the content of the memory chip may be destroyed after rebooting (AL-01Call the police).

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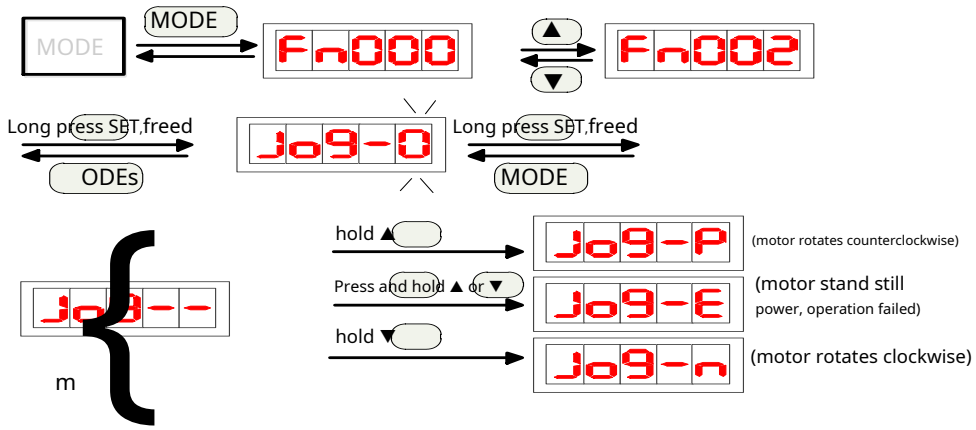
3.4.1.3Fn002Trial operation

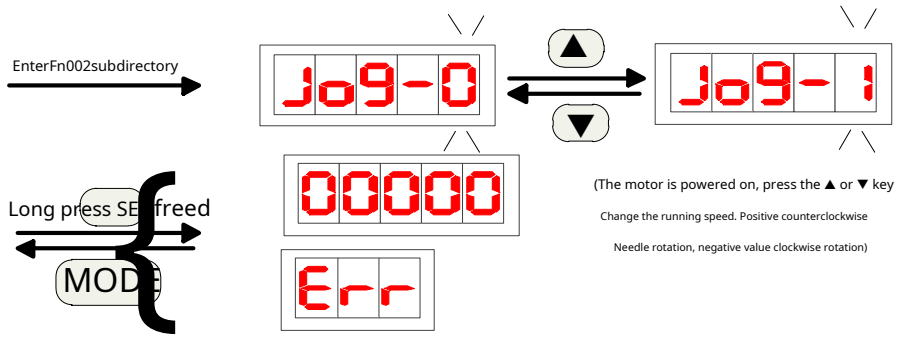
0: jog mode



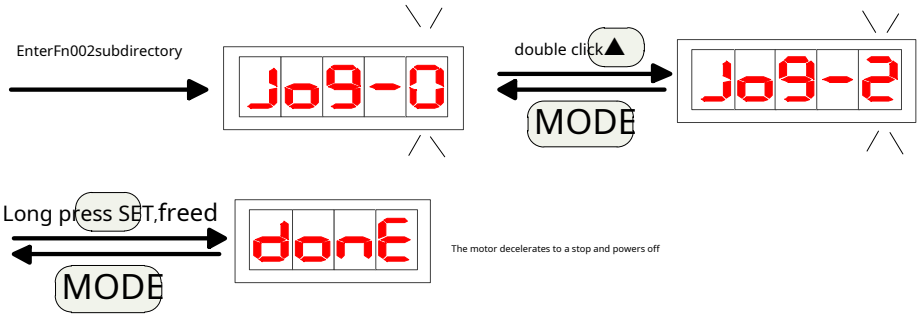
JogThe running speed and acceleration/deceleration time can be set by the following parameters:

Pn177	JOGspeed	0~5000	200	r/min
Pn178	JOGacceleration time	5~ 10000	100	ms
Pn179	JOGdeceleration time	5~ 10000	100	ms

1: Enter speed regulation mode



2:Exit governor mode



operating mode	illustrate
0	Jog mode. Press and hold the ▲ or ▼ key, the motor will go clockwise or counterclockwise The clock hand rotates; release the ▲ or ▼ key, the motor will stop rotating, and the Power off state.
1	Enter the speed regulation mode, and the motor will work with electricity. The drive is in speed loop mode mode, and the running speed is input by the key ▲ or ▼. During motor operation , other menu operations can be performed. If the motor stops rotating, Please enter Jog_2 mode.
2	Exit the speed regulation mode, and the motor is powered off.

Note: If the operation displays 

or 

, the possible reasons are:

1: The motor is enabled or rotating. existJOGBefore the trial operation, the motor must be in a non-working state. It is recommended for trial operation that the servo The drive control interface does not connect any control lines.

2: An alarm has occurred in the servo drive, and the alarm has not been cleared.

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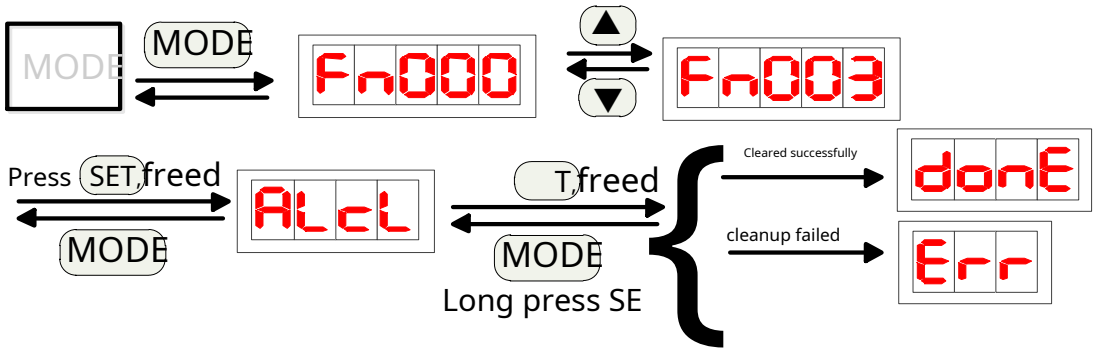
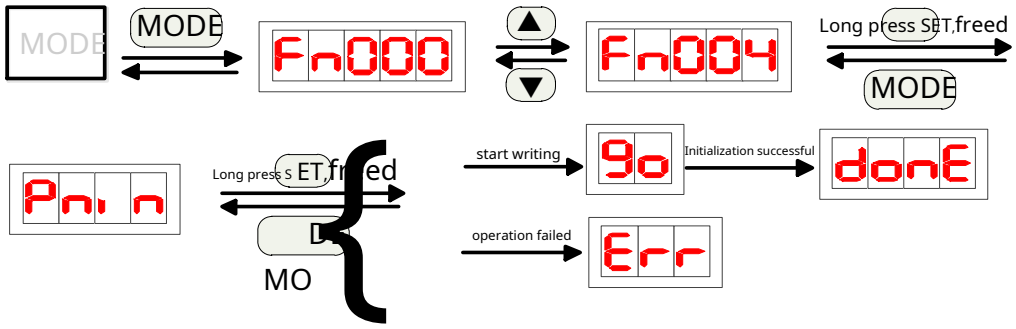
3.4.1.4Fn003Alarm clear operation



Description: When the last clearing fails, display  , the detected alarm can only be cleared after power on.

Alarms that can be cleared by clearing		Alarms that can only be cleared after power on	
AL--02	low voltage	AL--01	memory exception
AL--05	overload 1	AL--03	Overvoltage
AL--07	Motor speed is too high	AL--04	The intelligent power module is abnormal
AL--08	heatsink overheating	AL--06	overload 2
AL--10	Pulse frequency too high	AL--09	Encoder exception
AL--11	Position pulse deviation is too large	AL--13	CPU internal failure
AL--12	The current sampling circuit may be damaged	AL--17	The encoder signal frequency division output setting is abnormal
AL--14	emergency shutdown	AL--18	Improper motor code setting
AL--15	Drive disabled exception	AL--20	Function port duplication setting
AL--16	brake average power overload	AL--21	Memory contents completely destroyed
AL--19	Power module overheating	AL--22	Watchdog timer overflow
		AL--31~AL--43	Absolute encoder-related alarms

3.4.1.5Fn004Parameter initialization operation



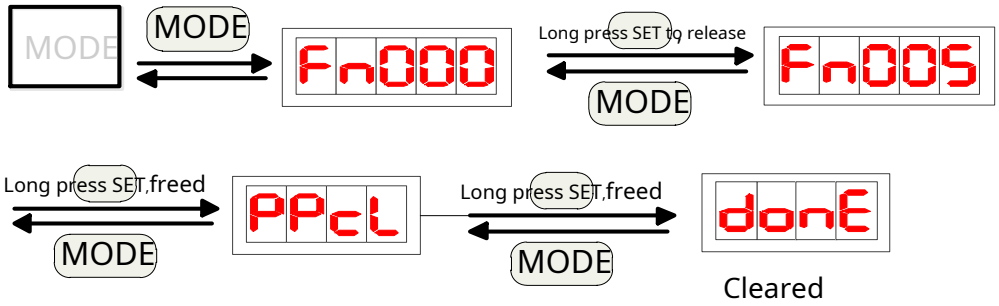
illustrate1: If the last operation shows  , its possible cause:

1: The drive is performing a write operation.

2:parameterPn000There is no open parameter initialization function.

illustrate2: You must wait for the writing to be completed before turning off the power, otherwise, the content of the memory chip may be destroyed after rebooting (AL-01Call the police).

3.4.1.6Fn005Position deviation clearing operation



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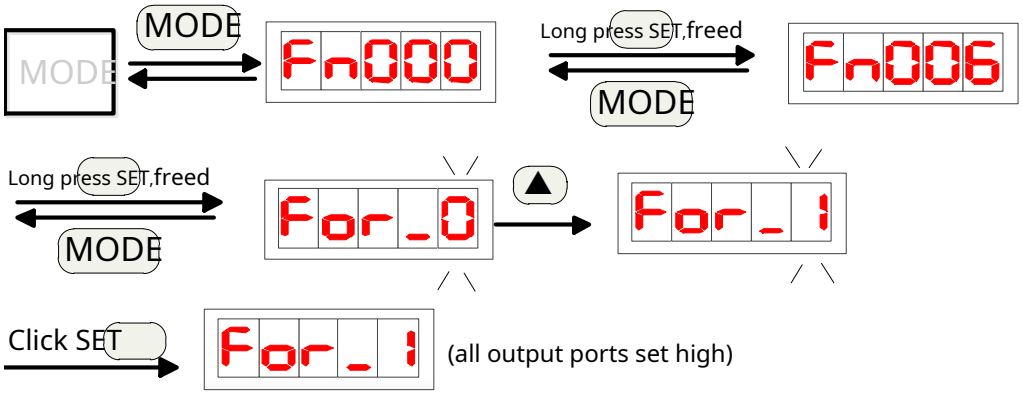
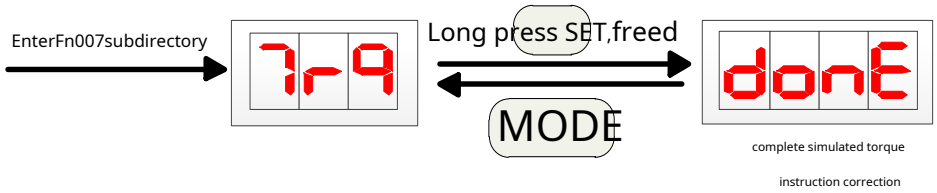
3.4.1.7Fn006port forced output



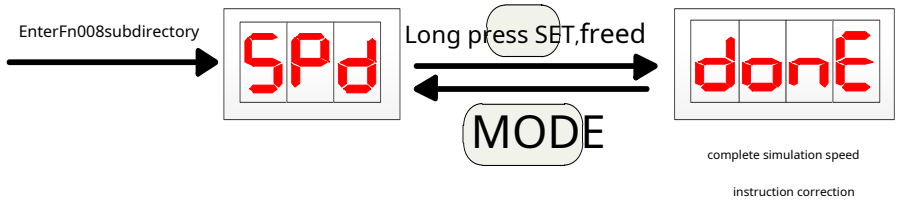
Preferences	illustrate
0	unenforced status
1	allSigOutport forced high
2	allSigOutport forced low

3.4.1.8 Fn007Analog torque command voltage correction



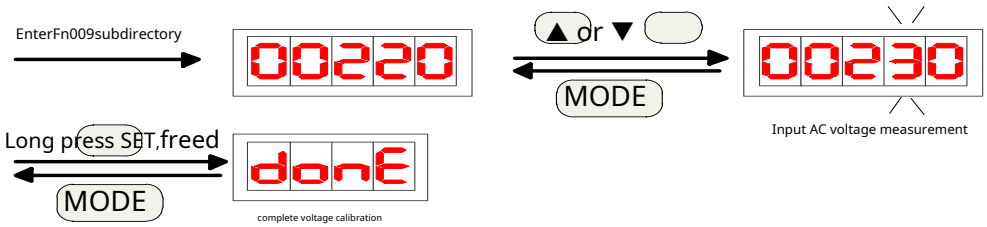
Note 1: Before performing the calibration operation, connect the analog voltage input port Vref (pin 25) of CN2 to the reference zero voltage.

3.4.1.9Fn008Analog speed command voltage correction



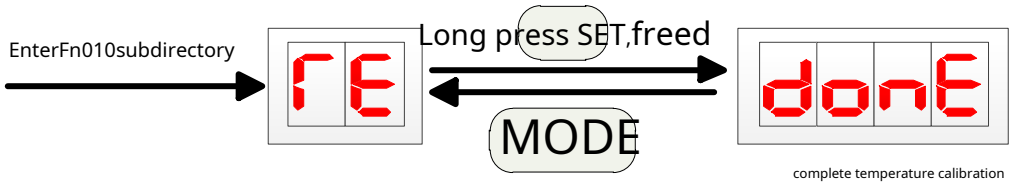
Note 1: Before performing the calibration operation, connect the analog voltage input port Vref (pin 25) of CN2 to the reference zero voltage.

3.4.1.10 Fn009bus voltage correction



Note 1: When performing calibration, the control power supply and power supply must be connected, and the AC voltage input by the driver must be measured and input into this operation.

3.4.1.11Fn010temperature correction



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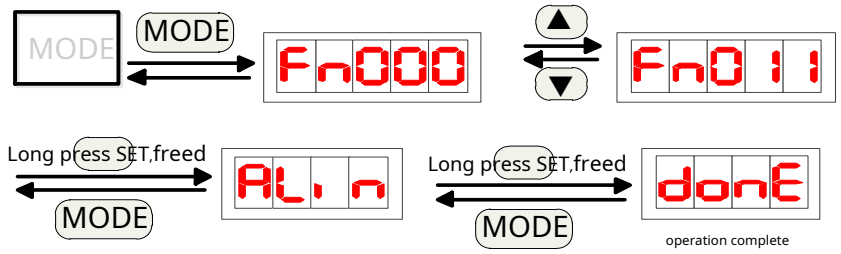
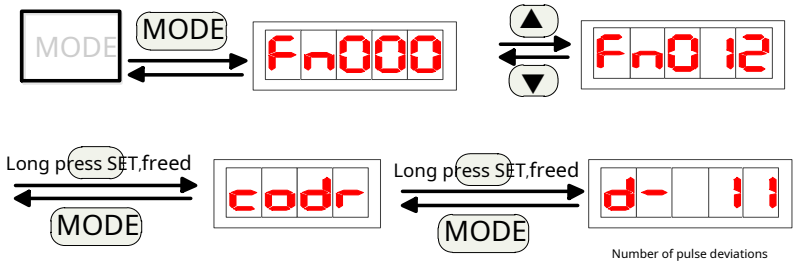
3.4.1.12Fn011Alarm record initialization operation



3.4.1.13 Fn012Encoder zeroing



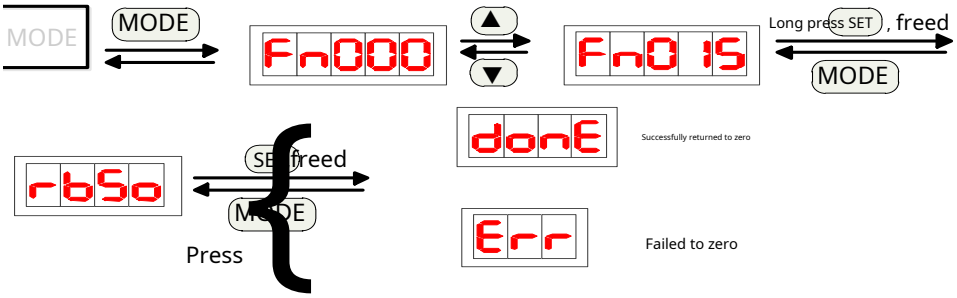
Before zeroing operation, confirm the motor codePn001The setting value is consistent with the actual motor model, otherwise it may cause excessive motor current and damage the motor.

When zeroing, there is no need to enable the motor internally or externally, the motor will rotate forward for a few turns, and then lock the zero position. When the number of displayed pulse deviations is less than 10, it can be considered that the motor has been aligned to the zero position.

Note1: If the motor heats up seriously, it must be cooled for a period of time.

Note2: After the zero adjustment of the absolute encoder is completed, wait for a few seconds to complete the data writing before turning off the power.

3.4.1.14 Fn015Absolute encoder multi-turn data reset to zero



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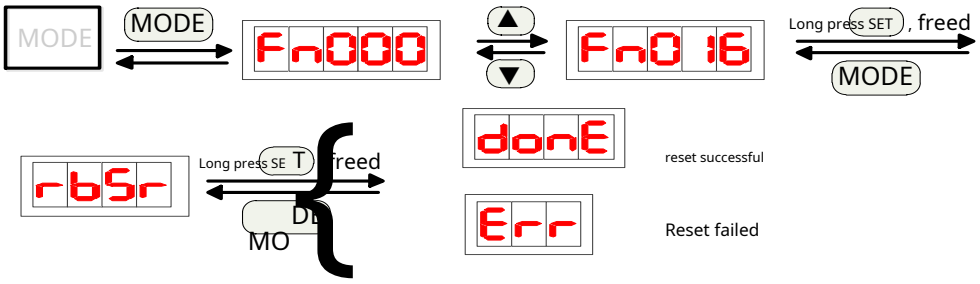
If reset to zero is successful, the multi-turn data will be reset0, at the same time all latched encoder alarms are reset; otherwise, it may be due to encoder communication

A fault alarm or the motor is enabled, resulting in the inability to reset the multi-turn data to zero.

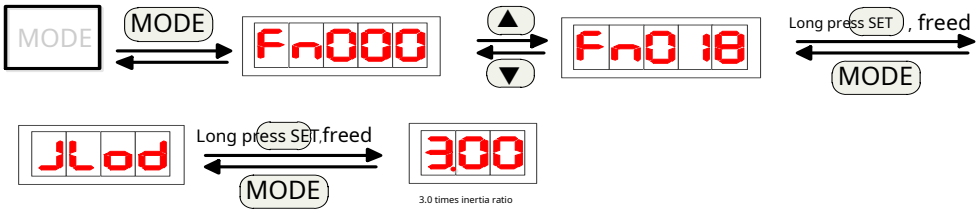
3.4.1.15 Fn016Absolute encoder alarm reset



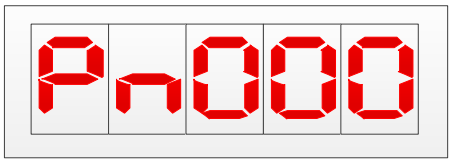
If the encoder alarm reset is successful, all latched encoder alarms will be reset;

The motor is in the enabled state, so the reset operation cannot be performed.

3.4.1.16 Fn018Load inertia estimation



3.5User parameter mode (Pn)operate



parameter mode function number

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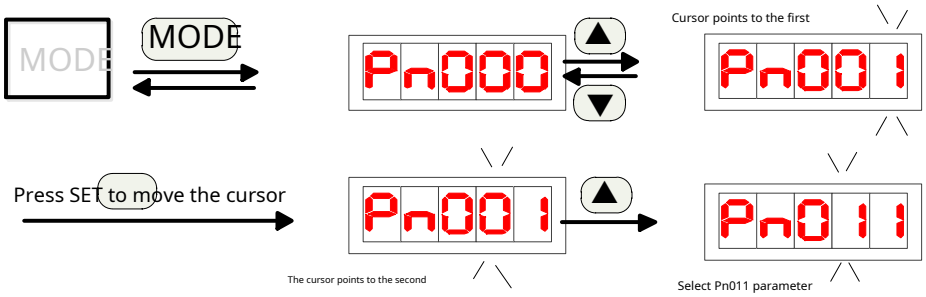
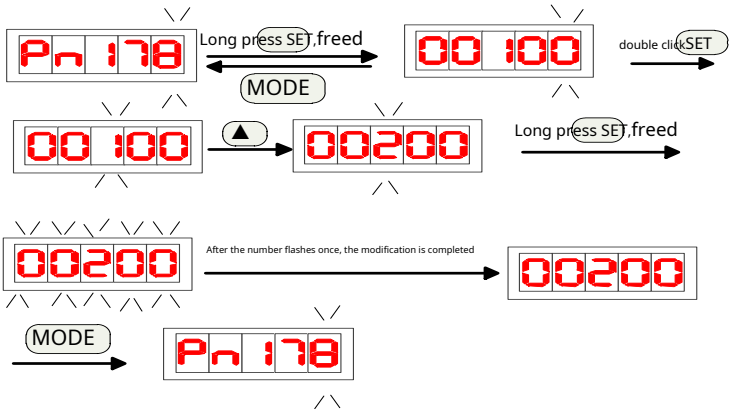
● Select parameter number

Example: selectPn011parameter.



● Parameter editing

Example: putPn178The current value of the parameter is given by100changed to200,The specific operation is as follows:



Note: After editing the parameters, please wait for 5 seconds before powering off.

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No.4chapterPnFunction parameter

4.1Parameter setting panel operation

For details, see Chapter 3 "User parameter mode operation ".

4.2List of parameters

● In the number column, if there is a symbol ▲, it means that after parameter setting, the power must be restarted to take effect; if there is a symbol ◆, it means that after parameter setting, restart The parameter will take effect only when the motor is newly enabled; if there is no special symbol, it means it will take effect immediately.

● In the applicable mode column,allIndicates that it is suitable for torque, speed and position control,TIndicates that it is suitable for torque control,SIndicates suitable for speed control,PIndicates that it is suitable for position control.

● The parameters must be set carefully. Improper setting may lead to unstable operation of the motor.

4.2.1System Control Parameters

serial number	name	Ranges	default value	unit	Be applicable
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 off enable stop mode	0~2	0	-	all
Pn005	Enable deceleration time	5~10000	100	ms	all
Pn006	Use/not use positive and negative drive prohibition	0~3	0	-	all
Pn007	Forward/reverse drive prohibited stop 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 rotation (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
Pn016▲	Molecular DA of incremental encoder frequency division output	1~127	1	-	all
Pn017▲	Denominator DB of incremental encoder frequency division output	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 the predetermined speed	0~5000	500	r/min	all
Pn022	Arrival at scheduled speed hysteresis comparison difference	0~5000	30	r/min	all
Pn023	Arrive at the predetermined speed detection direction	0~2	0	-	all
Pn024	reach the predetermined torque	0~300	100	%	all
Pn025	Reaching the predetermined torque hysteresis comparison difference	0~300	5	%	all
Pn026	Reach the predetermined torque direction	0~2	0	-	all
Pn027	Zero speed detection range setting	0~1000	10	r/min	all
Pn028	Zero speed detection hysteresis	0~1000	5	r/min	all
Pn029	Motor electromagnetic brake zero speed detection point	0~1000	5	r/min	all
Pn030	Electromagnetic brake delay time when the motor is stationary	0~2000	0	ms	all
Pn031	Electromagnetic brake waiting time when the motor is running	0~2000	500	ms	all
Pn032	Electromagnetic brake action speed when the motor is running	0~3000	30	r/min	all
Pn033	Origin return trigger mode	0~3	0	-	all
Pn034	Return-to-origin reference point mode	0~6	0	-	all
Pn035	Return to origin mode	0~2	0	-	all
Pn036	Origin position offset high	- 9999~9999	0	ten thousand	all
Pn037	Origin position offset low	- 9999~9999	0	indivual	all
Pn038	Origin return first speed	1~3000	200	r/min	all
Pn039	Origin return second speed	1~3000	50	r/min	all
Pn040	Return to origin acceleration time	5~10000	50	ms	all
Pn041	Origin return deceleration time	5~10000	50	ms	all
Pn042	Origin in-position delay	0~3000	100	ms	all
Pn043	Origin return completion 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	Motor running maximum speed limit	0~5000	3000	-	all
Pn052▲	SigIn1 port function assignment	- 31~31	1	-	all
Pn053▲	SigIn2 port function assignment	- 31~31	2	-	all
Pn054▲	SigIn3 port function assignment	- 31~31	19	-	all
Pn055▲	SigIn4 port function assignment	- 31~31	20	-	all
Pn056	SigIn1 port filter time	1~1000	2	ms	all
Pn057	SigIn2 port filter time	1~1000	2	ms	all
Pn058	SigIn3 port filter time	1~1000	2	ms	all
Pn059	SigIn4 port filter time	1~1000	2	ms	all
Pn060▲	SigOut1 port function assignment	- 14~14	2	-	all
Pn061▲	SigOut2 port function assignment	- 14~14	1	-	all
Pn062▲	SigOut3 port function assignment	- 14~14	4	-	all
Pn063▲	SigOut4 port function assignment	- 14~14	3	-	all
Pn064▲	way of communication	0~2	2	-	all
Pn065	communication site	1~254	1	-	all
Pn066▲	Communication baud rate	0~5	5	-	all
Pn067▲	Communication mode setting	0~8	8	-	all
Pn068	Input function control mode selection register 1	0~32767	0	-	all
Pn069	Input function control mode selection register 2	0~32767	0	-	all
Pn070	Input Function Logic State Setting Register 1	0~32767	32691	-	all
Pn071	Input Function Logic State Setting Register 2	0~32767	32767	-	all
Pn072	Input function control mode selection register 3	0~1	0	-	all
Pn073	Input Function Logic State Setting Register 3	0~1	1	-	all
Pn074	fan on temperature	30~70	50	Celsius	all
Pn075	How the fan works	0~2	0	-	all
Pn076	Emergency stop (EMG) reset method	0~1	0	-	all
Pn077	Forward/reverse drive prohibition detection	0~2	0	-	all
Pn078	Insufficient voltage detection	0~1	1	-	all
Pn079	System status display item selection	0~30	0	-	all

Pn080▲	Incremental encoder lines	0~16000	0	Wire	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	Celsius	all
Pn085▲	Number of motor pole pairs	0~100	0	right	all
Pn086	internal use	-	-	-	-
Pn087▲	Selection of braking resistor	0~2	1	-	all
Pn088	Brake resistor regeneration overload alarm level	50~250	90	%	all
Pn089▲	Power of external braking resistor	20~20000	100	W	all
Pn090▲	Resistance value of external braking resistor	10~1000	100	-	all
Pn091	External braking resistor regenerative available capacity	5~100	20	%	all
Pn092	Brake resistor overload detection	0~1	1	-	all
Pn093~Pn095	internal use	-	-	-	-

4.2.2Position Control Parameters

serial number	name	Ranges	Defaults	unit	Be applicable
Pn096▲	Command pulse input method	0~2	0	-	P
Pn097▲	Command pulse input direction logic selection	0~1	0	-	P
Pn098	Numerator of pulse electronic gear ratio 1	1~32767	1	-	P
Pn099	Numerator of pulse electronic gear ratio 2	1~32767	1	-	P
Pn100	Numerator of pulse electronic gear ratio 3	1~32767	1	-	P
Pn101	Numerator of pulse electronic gear ratio 4	1~32767	1	-	P
Pn102▲	Denominator of pulse electronic gear ratio	1~32767	1	-	P
Pn103	Position deviation out of range setting	1~ 2000	500	ten thousand	P
Pn104	Location positioning complete range setting	0~ 32767	10	indivual	P
Pn105	Position positioning completes hysteresis setting	0~ 32767	3	indivual	P
Pn106	Location positioning proximity range setting	0~ 32767	300	indivual	P
Pn107	Position positioning close to hysteresis setting	0~ 32767	30	indivual	P
Pn108	Position deviation clearing method	0~1	1	-	P

Pn109◆	Acceleration and deceleration mode of position command	0~2	0	-	P
Pn110◆	Position command primary filter time constant	5~500	50	ms	P
Pn111◆	Position command S-shape filter time constant Ta	5~340	50	ms	P
Pn112◆	Position command S-shape filter 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	Position command source selection	0~3	0	-	P
Pn118	Internal position command pause mode selection	0~1	0	-	P
Pn119	Internal position pause deceleration time	0~10000	50	ms	P
Pn120	Internal position command 0 pulse number high bit setting	- 9999~9999	0	ten thousand	P
Pn121	Internal position command 0 pulse number low bit setting	- 9999~9999	0	indivual	P
Pn122	Internal position command 1 pulse number high bit setting	- 9999~9999	0	ten thousand	P
Pn123	Internal position command 1 pulse number low bit setting	- 9999~9999	0	indivual	P
Pn124	Internal position command 2 pulse number high bit setting	- 9999~9999	0	ten thousand	P
Pn125	Internal position command 2 pulse number low bit setting	- 9999~9999	0	indivual	P
Pn126	Internal position command 3 pulse number high bit setting	- 9999~9999	0	ten thousand	P
Pn127	Low bit setting of internal position command 3 pulse number	- 9999~9999	0	indivual	P
Pn128	Internal position command 0 Running speed	0~3000	100	r/min	P
Pn129	Internal position command 1 running speed	0~3000	100	r/min	P
Pn130	Internal position command 2 running speed	0~3000	100	r/min	P
Pn131	Internal position command 3 running speed	0~3000	100	r/min	P
Pn132	How to switch from torque/speed control 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 displacement high position	0~9999	0	ten thousand	P
Pn136	Fixed length displacement low position	0~9999	100	indivual	P
Pn137	fixed length maximum running speed	5~5000	200	r/min	P
Pn138	Fixed-length lock release method	0~1	1	-	P
Pn139	Vibration suppression attenuation ratio at stop	10~100	100	%	P

Pn140	Vibration suppression waiting time at stop	0~30000	300	ms	P
Pn141	Vibration suppression condition at stop	0~10000	10	pulse	P
Pn142~Pn145	internal use	-	-	-	-

4.2.3Speed Control Parameters

serial number	name	Ranges	Defaults	unit	Be applicable
Pn146◆	Acceleration and deceleration mode of speed command	0~2	1	-	S
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 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 integral time constant 1	1~ 5000	150	0.1ms	all
Pn155	Speed Regulator Proportional Gain 2	1~ 2000	80	Hz	all
Pn156	Speed regulator integral time constant 2	1~ 5000	150	0.1ms	all
Pn157▲	Analog speed command smoothing filter time	1~500	1	0.1ms	S
Pn158	Analog speed command gain	1~1500	300	r/min/V	S
Pn159	Analog speed command offset adjustment	- 5000~5000	0	mv	S
Pn160	Analog speed command direction	0~1	0	-	S
Pn161	The upper limit of the forced zero range of the analog speed command	0~1000	0	10mv	S
Pn162	The lower limit of the forced zero range of the analog speed command	- 1000~0	0	10mv	S
Pn163	Zero speed clamp locking method	0~1	0	-	S
Pn164	Zero speed clamp trigger mode	0~1	0	-	S
Pn165	Zero Speed Clamp Level	0~200	6	r/min	S
Pn166	Zero speed clamp deceleration time	5~10000	50	ms	S
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 coefficient	0~100	100	-	P.S.
Pn183~	Speed Feedback Compensation	0~100	0	%	P.S.
Pn184~ Pn185	internal use	-	-	-	-

4.2.4Torque Control Parameters

serial number	name	Ranges	Defaults	unit	Be applicable
Pn186	Acceleration and deceleration mode of torque command	0~1	0	-	T
Pn187▲	Torque command linear acceleration and deceleration time constant	1~30000	1	ms	T
Pn188▲	Analog torque command smoothing filter 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 command direction	0~1	0	-	T
Pn192	Torque Q axis regulator proportional gain 1	5~ 2000	100	%	all
Pn193	Torque Q-axis regulator integral time constant 1	5~ 2000	100	%	all
Pn194	Torque Q axis regulator proportional gain 2	5~ 2000	100	%	all
Pn195	Torque Q-axis regulator integral time constant 2	5~ 2000	100	%	all
Pn196	Torque command filter time constant 1	1~5000	40	0.01ms	all
Pn197	Torque command filter time constant 2	1~5000	40	0.01ms	all
Pn198	Speed limit 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	Source of torque command	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 coefficient	1~3000	100	-	T
Pn208	Tracking torque command judgment error range 1	0~300	5	%	T
Pn209	Tracking torque command judgment error range 2	0~300	2	%	T
Pn210	Judgment time of speed limit output	0~2000	15	ms	T
Pn211~ Pn215	internal use	-	-	-	-

4.2.5Extended Control Parameters

serial number	name	Ranges	Defaults	unit	Be applicable
Pn216▲	Absolute Encoder Usage Options	0~1	1	-	all
Pn217	Absolute encoder output lines	16~16384	2500	Wire	all
Pn218	Absolute encoder absolute position data transmission method	0~1	0	-	all
Pn219	Absolute encoder multi-turn overflow detection	0~1	1	-	all
Pn220▲	SigIn5 port function assignment	- 31~31	3	-	all
Pn221▲	SigIn6 port function assignment	- 31~31	4	-	all
Pn222▲	SigIn7 port function assignment	- 31~31	9	-	all
Pn223▲	SigIn8 port function assignment	- 31~31	10	-	all
Pn224▲	SigIn9 port function assignment	- 31~31	11	-	all
Pn225▲	SigIn10 port function assignment	- 31~31	0	-	all
Pn226	SigIn5 port filter time	1~1000	2	ms	all
Pn227	SigIn6 port filter time	1~1000	2	ms	all
Pn228	SigIn7 port filter time	1~1000	2	ms	all
Pn229	SigIn8 port filter time	1~1000	2	ms	all

Pn230	SigIn9 port filter time	1~1000	2	ms	all
Pn231	SigIn10 port filter time	1~1000	2	ms	all
Pn232▲	SigOut5 port function assignment	- 14~14	9	-	all
Pn233	internal use	-	-	-	-
Pn234	Pulse command maximum frequency	20~2000	550	KHZ	P
Pn235	Pulse command digital filter time	0~255	0	100ns	P
Pn236~ Pn239	internal use	-	-	-	-
Pn240	Absolute encoder forward soft forbidden multi-turn value	0~32000	0	lock up	all
Pn241	Absolute encoder forward soft prohibition single-turn value	0~9999	0	0.0001 turns	all
Pn242	Absolute encoder reverse soft prohibition multi-turn value	0~32000	0	lock up	all
Pn243	Absolute encoder reverse soft prohibition single-turn value	0~9999	0	0.0001 turns	all
Pn244	Home return positioning approach range	0~3000	20	indivual	all
Pn245~ Pn256	internal use	-	-	-	-
Pn257	Load moment of inertia ratio	0.00~100.00	1.00	times	P.S.
Pn258	Gain adjustment mode	0~1	0	-	P.S.
Pn259	Rigidity level selection	0~20	5	-	P.S.
Pn260	Inertia real-time estimation method	0~1	0	-	all
Pn260~ Pn262	internal use	-	-	-	-
Pn263◆	Inertia estimation acceleration and deceleration time	20~500	80	ms	all
Pn264◆	Inertia estimation allowable maximum speed	150~1000	400	r/min	all
Pn265◆	Inertia estimation pause time interval	0~10000	500	ms	all
Pn266◆	Inertia estimated inertia ratio estimated value	1.00~20.00	3.00	times	all
Pn267▲	Motor rated torque	0~320.00	0	N·m	all
Pn268▲	Motor maximum output torque	0~300.00	0	times	all
Pn269▲	Moment of inertia of motor	0~320.00	0	Kg·M^2·10^-4	all
Pn270▲	Motor torque coefficient	0~100.00	0	N·m/Arms	all
Pn271▲	motor speed	80~5500	80	r/min	all
Pn272~	internal use	-	-	-	-

Pn275					
Pn276	Turn on the programmable motion controller	0~1	0	-	all
Pn277~Pn280	internal use	-	-	-	-

4.3Detailed parameters

4.3.1 System parameters

serial number	name	Ranges	Defaults	unit	Be applicable
Pn000	Parameter editing and initialization	0~3	1		all

set value	Function
0	Disable parameter initialization
1	Allow parameter initialization, but do not initialize Pn001, Pn080, Pn159, Pn190 and other application-independent function parameters.
2	Restore factory settings.
3	Press the button to view the mode, and the parameters cannot be modified.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn001▲	motor code	0-70	7		all
	The motor code matching the motor must be set, so that the motor can work normally.				

The matching table of 220V driver model and motor model is as follows:

motor model	Pn001	Rated speed (r/min)	Rated torque (NM)	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	twenty one	1000	10	1	√	√	√		
130st_m10015	twenty two	1500	10	1.5		√	√		
130st_m10025	twenty three	2500	10	2.6			√	√	√
130st_m15015	twenty four	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	twenty three	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 matching table of 380V driver model and motor model is as follows:

motor model	Pn001	Rated speed (r/min)	Rated torque (NM)	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		√	√	√

serial number	name	Ranges	Defaults	unit	Be applicable
Pn002▲	control mode	0~5	2		all

set value	control mode
0	torque mode
1	speed mode
2	location mode
3	position/velocity mode
4	Position/Torque Mode
5	Speed/Torque Mode

· When set to 3, 4, 5, the switching between modes is determined by the state of the Cmode signal of the input port SigIn.

· For details on the control mode switching method, seeAppendix B

serial number	name	Ranges	Defaults	unit	Be applicable
Pn003	Servo enable mode	0~1	0		all

Settings	Function
0	Driver enabled by SON at input port SigIn
1	Automatically enable the driver after power-on

serial number	name	Ranges	Defaults	unit	Be applicable
Pn004	Servo off enable stop mode	0~2	0		all

When the enable signal changes from valid to invalid, the way to stop the motor can be set:

Settings	Electromagnetic brake	Deceleration stop	illustrate
0	Do not use	Do not use	coasting
1	Do not use	use	Decelerate to stop, the deceleration time is determined by Pn005
2	use	Do not use	Stop by electromagnetic brake (for motors with electromagnetic brakes)

serial number	name	Ranges	Defaults	unit	Be applicable
Pn005	Enable deceleration time	5-10000	100	ms	all

Time to decelerate the motor to zero when the enable signal changes from active to inactive. During deceleration, if the enable signal

The second time is valid, the motor will still decelerate to zero first

serial number	name	Ranges	Defaults	unit	Be applicable
Pn006	Use/not use positive and negative drive prohibit	0-3	0		all

When setting this parameter value, you can choose to use or not use the drive prohibition function. The truth table is as follows:

Settings	Forward drive prohibited	Reverse drive prohibited
0	Do not use	Do not use
1	Do not use	use
2	use	Do not use
3	use	use

serial number	name	Ranges	Defaults	unit	Be applicable
Pn007	Forward/reverse drive prohibited stop minus speed time	0-10000	60	ms	all
	When an overtravel occurs, the ccwl or cwl state of the SigIn port is OFF, use Pn077 to set whether to report Police checked out. When overtravel, the motor can decelerate according to the deceleration time, and at the same time clear the position command pulse (position control), Internal position locking after stop. The internal position gain is adjusted through Pn167.				

serial number	name	Ranges	Defaults	unit	Be applicable
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 of the motor in CCW/CW direction. When the internal and external torque limits are valid at the same time, the actual torque takes Smaller limit value. · The external torque limit is controlled by TCCWL and TCWL of the SigIn port. · The maximum output torque of some motors is twice the rated torque, the maximum output torque of the motor is automatically limited by two times the rated torque.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn012	Forward rotation (CCW) torque overload 1 alarm Police 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 and overcurrent relative to the rated output current of the motor, and the range of overload capacity is 0 and the maximum output current. The overload capacity of overload 1 defaults to 2 times the torque, within the set time, if the Continuously exceed 2 times the output torque, it will perform overload 1 protection. · Within the set time, when the motor reaches the allowable rated torque output multiple, the overload 2 protection will be executed. · If the overload level setting is greater than the corresponding internal/external torque limit value, the overload condition may not be met, and the Guard will not work.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn016▲	Incremental encoder frequency division output Molecular DA	1~127	1		all
Pn017▲	Incremental encoder frequency division output denominator DB	1~127	1		all
	Incremental encoder output electronic gear ratio, used for frequency division output of encoder pulse signal, only applicable to Servo unit with incremental encoder. The frequency division value must satisfy: DA/DB>=1. For example, the encoder is 2500 lines, Frequency division value DA/DB=25/8, then the number of lines after frequency division: 2500/(DA/DB)=2500/(25/8)= 800 lines.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn018▲	Encoder output pulse AB phase bit logical inversion	0-1	0		all

Settings	Function
0	When the motor rotates counterclockwise, A advances B; when it rotates clockwise, B advances A
1	When the motor rotates counterclockwise, B advances A; when it rotates clockwise, A advances B

serial number	name	Ranges	Defaults	unit	Be applicable
Pn019▲	Rated current setting	0.0-100.0	0	Arms	all
Pn020▲	Rated speed setting	0~5000	Rated speed	r/min	all
	If the parameter is set to 0, the default value set by the manufacturer will be used; otherwise, the user must strictly follow the rated current of the motor Effective value and rated speed and corresponding internal positive and negative torque limit value set parameter values. If not set properly, the motor will not can function normally. Depending on the driver model and motor code, the maximum actual current value that can be achieved is different. one Ordinary users do not modify				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn021	Reach the predetermined speed	0~5000	500	r/min	all
Pn022	Arrival at scheduled speed hysteresis comparison difference	0~5000	30	r/min	all
Pn023	Arrive at the predetermined speed detection direction	0-2	0		all

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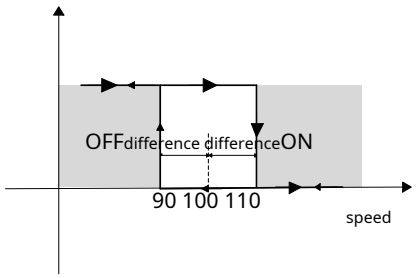
Pn023

· When the running speed of the motor exceeds the set judgment value, the Sreach of the output port SigOut will turn ON, Otherwise it is OFF.

· The comparator has a hysteresis comparison characteristic. If the difference setting value is too small, the output signal cut-off frequency will be higher; if the setting value is larger, The switch-off frequency is small, but at the same time leads to a reduction in the resolution of the comparator. Example: set the predetermined speed to 100, set the difference for 10.



· The speed detection direction can be set, as shown in the following table:

Pn023	Comparators
0	Both positive and negative detection
1	Only detect the speed of forward rotation; when it is reverse, the signal is OFF
2	Only detect reverse speed; when forward, the signal is OFF

serial number	name	Ranges	Defaults	unit	Be applicable
Pn024	reach the predetermined torque	0-300	100	%	all
Pn025	Arrival at scheduled torque hysteresis comparison difference	0-300	5	%	all
Pn026	Reach the predetermined torque direction	0-2	0		all

· When the running torque of the motor exceeds the set judgment value, the Treach of the output port SigOut will turn ON, otherwise is OFF.

· Torque detection direction can be set, as shown in the following table:

Pn026	Comparators
0	Both positive and negative detection
1	Only detect forward rotation torque; when reverse rotation, the signal is OFF.
2	Only reverse rotation torque is detected; when forward rotation, the signal is OFF.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn027	Zero speed detection range setting	0~1000	10	r/min	all
Pn028	Zero speed detection hysteresis	0~1000	5	r/min	all
	When the running speed of the motor is lower than the set speed value, the zerospeed of the output port SigOut turns ON, otherwise is OFF.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn029	Motor electromagnetic brake zero speed detection point	0~1000	5	r/min	all
	Only when the electromagnetic brake function is used, judge whether the motor is in the zero speed state.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn030	Electromagnetic brake when the motor is stationary delay time	0~2000	0	Mrs.	all
	· When the motor is stationary, the delay time from the start of electromagnetic brake braking to the moment when the motor cuts off the current. · When using the electromagnetic brake function, the servo off enable mode Pn004 must be set to 2.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn031	Electromagnetic brake when the motor is running waiting time	0~2000	500	ms	all
	When the motor is running, the waiting time between the motor cutting off the current and the electromagnetic brake braking.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn032	Electromagnetic brake when the motor is running Action speed	0-3000	30	r/min	all
	When the motor is running, when the motor is lower than the speed set by this parameter, the magnetic brake starts to brake.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn033	Origin return trigger mode	0~3	0		all

Settings	Function
0	Turn off the homing function
1	Triggered by the GOH level of the input port SigIn
2	Triggered by the rising edge of GOH at the input port SigIn
3	Power-on automatic execution

· Refer to the execution method of homingAppendix F .

serial number	name	Ranges	Defaults	unit	Be applicable
Pn034	Return-to-origin reference point mode	0~6	0		all

Settings	Function
0	Look for REF (rising edge trigger) as the reference point when turning forward
1	Reverse to find REF (rising edge trigger) as a reference point
2	Forward rotation find CCWL (falling edge trigger) as reference point
3	Reverse to find CWL (falling edge trigger) as a reference point
4	Forward rotation to find Z pulse as reference point
5	Reverse to find Z pulse as reference point
6	Absolute zero as reference point

Note: When CCWL or CWL is used as the reference point, the parameter Pn006 needs to be set to enable the function.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn035	Return to origin mode	0~2	0		all

Settings	Function
0	Find the Z pulse backward as the origin
1	Find the Z pulse forward as the origin
2	Directly take the rising edge of the reference point as the origin

serial number	name	Ranges	Defaults	unit	Be applicable
Pn036	Origin position offset high	- 9999~9999	0	million pulses	all
Pn037	Origin position offset low	- 9999~9999	0	pulse	all
	After finding the origin, add the offset (Pn036*10000+ Pn037) as the actual origin.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn038	Origin return first speed	1~3000	200	R/min	all
Pn039	Origin return second speed	1~3000	50	R/min	all
	When performing homing operation, search for the reference point at the first speed, and search for it at the second speed after reaching the reference point origin. The second speed should be less than the first speed.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn040	Return to origin acceleration time	5~10000	50	ms	all
Pn041	Origin return deceleration time	5~10000	50	ms	all
	During homing execution, the time for the motor to accelerate from zero speed to rated speed is only used for homing operation.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn042	Origin in-position delay	0~3000	60	ms	all
	After reaching the origin, delay for a period of time to make the motor completely static. After the delay is completed, the output port SigOut The HOME output turns ON.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn043	Origin return completion signal delay	5~3000	80	ms	all
	How long HOME lasts				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn044	Origin return instruction execution mode	0~1	0		all

Settings	Function
0	After the homing is completed, wait for the HOME signal to be OFF before receiving and executing the command.

	1	After the homing is completed, the command is received and executed immediately.	

serial number	name	Ranges	Defaults	unit	Be applicable
Pn045	Gain switching selection	0~5	0		all

Settings	Function
0	Fixed 1st gain.
1	Fixed 2nd gain.
2	Controlled by the Cgain terminal of the input port SigIn, OFF is the first gain, ON is the 2nd gain.
3	Controlled by the speed command, when the speed command exceeds Pn046, switch to the 1st gain.
4	Controlled by pulse deviation, when the position deviation exceeds Pn046, switch to the 1st gain.
5	Controlled by the motor speed, when the position deviation exceeds Pn046, switch to the first gain.

· For details on gain switching, seeAppendix A

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serial number	name	Ranges	Defaults	unit	Be applicable
Pn046	Gain switching level	0~30000	80		all
Pn047	Gain switching back difference	0~30000	6		all

According to the setting of Pn045 parameter, the switching condition and unitAllAre not the same:

Pn045	Gain switching condition	unit
3	speed command	r/min
4	Pulse deviation	pulse
5	Motor speed	r/min

serial number	name	Ranges	Defaults	unit	Be applicable
Pn048	Gain switching delay time	0~20000	20	0.1ms	all

Delay time from when the gain switching condition is satisfied to when switching starts. If a switching condition is detected during the delay phase without

If satisfied, cancel the switching.

serial number	name	Ranges	Defaults	unit	Be applicable
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 linearly and smoothly changes to the target gain combination within this time, and the combination All the parameters are changed at the same time.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn051	Motor running maximum speed limit	0~5000	3000		all
	It is used to limit the maximum speed of motor operation. The set value should be less than or equal to the rated speed, otherwise the motor can run The highest speed is the rated speed.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn052▲	SigIn1 port function assignment	- 31~31	1		all
Pn053▲	SigIn 2 port function assignment	- 31~31	2		all
Pn054▲	SigIn 3 port function assignment	- 31~31	19		all
Pn055▲	SigIn 4 port function assignment	- 31~31	8		all
Pn220▲	SigIn5 port function assignment	- 31~31	3		all
Pn221▲	SigIn6 port function assignment	- 31~31	4		all
Pn222▲	SigIn7 port function assignment	- 31~31	9		all
Pn223▲	SigIn8 port function assignment	- 31~31	10		all
Pn224▲	SigIn9 port function assignment	- 31~31	11		all
Pn225▲	SigIn10 port function assignment	- 31~31	0		all

· Refer to the SigIn function detailed table for specific function allocation.

· - 1~-31 function number is the corresponding negative logic of 1-31 function number, the function is the same, but the effective level is opposite.

Settings	SigIn input level	SigIn corresponds to the function number
positive value	low level	ON
	high level	OFF
negative value	low level	OFF
	high level	ON

serial number	name	Ranges	Defaults	unit	Be applicable
Pn056	SigIn 1 port filter time	1~1000	2	ms	all
Pn057	SigIn 2-port filter time	1~1000	2	ms	all
Pn058	SigIn 3-port filter time	1~1000	2	ms	all
Pn059	SigIn 4-port filter time	1~1000	2	ms	all
Pn226	SigIn5 port filter time	1~1000	2	ms	all
Pn227	SigIn6 port filter time	1~1000	2	ms	all
Pn228	SigIn7 port filter time	1~1000	2	ms	all
Pn229	SigIn8 port filter time	1~1000	2	ms	all
Pn230	SigIn9 port filter time	1~1000	2	ms	all
Pn231	SigIn10 port filter time	1~1000	2	ms	all
	Digitally filter the input port SigIn.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn060▲	SigOut1 port function assignment	- 14~14	2		all
Pn061▲	SigOut 2 port function assignment	- 14~14	1		all
Pn062▲	SigOut 3 port function assignment	- 14~14	4		all
Pn063▲	SigOut 4 port function assignment	- 14~14	7		all
Pn232▲	SigOut 3 port function assignment	- 14~14	9		all
Pn233▲	SigOut 4 port function assignment	- 14~14	10		all

For specific function allocation, refer to the SigOut function detailed table.

parameter value	Corresponding function number	SigOut output result
positive value	ON	low level
	OFF	high level
negative value	OFF	low level
	ON	high level

serial number	name	Ranges	Defaults	unit	Be applicable
Pn064▲	way of communication	0-2	2		all

Settings	Function
0	no communication
1	RS-232
2	RS-485

· See the communication protocol for detailsChapter 7 Modbus Communication Function

serial number	name	Ranges	Defaults	unit	Be applicable
Pn065	communication site	1-254	1		all

When using Modbus communication, different station numbers should be set in advance for each group of drivers; if the station number is set repeatedly,

Communication will be paralyzed.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn066▲	Communication baud rate	0-5	5		all

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

serial number	name	Ranges	Defaults	unit	Be applicable
Pn067▲	Communication mode setting	0-8	8		all

Parameter values are defined in the following table, see Chapter 7 Modbus Communication Functions for details

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)

serial number	name	Ranges	Defaults	unit	Be applicable
Pn068	Input function control mode selection register 1	0~32767	0		all
Pn069	Input function control mode selection register 2	0~32767	0		all

• Determine whether the function is controlled by the communication method or the port input method. If the communication mode control is not performed, just set it to 0.

· Pn068 parameter:

bit	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Function	ZeroLock	EMG	TCW	TCCW	CWL	CCWL	Alarmrst	Son
Defaults	0	0	0	0	0	0	0	0

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
reserve	C gain	Cmode	TR2	TR1	Sp3	Sp2	Sp1
0	0	0	0	0	0	0	0

· Pn069 parameter:

bit	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Function	REF	GOH	PC	INH	Pclear	Cinv	Gn2	Gn1
Defaults	0	0	0	0	0	0	0	0

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

· In communication control, make sure the above functions are changed by the input port on CN2 or by communication control. If set to 0, the input on CN2 Port control change; set to 1, change by communication control. The default is all controlled by the input port. Example: son sp3 sp2 sp1 function It is controlled by communication mode, and others are controlled by input ports. The setting value is 00000111_00000001 (binary) --> 0x0701 (ten Hexadecimal) -->1793 (decimal), so set the value of Pn068 parameter to 1793.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn070	Input function logic state setting register 3	0~32767	32691		all
Pn071	Input function logic state setting register 3	0~32767	32767		all

When performing RS232 or RS485 communication, and set Pn068, the corresponding bit of Pn069 is controlled by communication, carry out the corresponding bit of this parameter The state of the input function signal can be controlled by setting or clearing the line. Logic 0 is the active state.

· Pn070 parameter:

bit	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
reserve	C gain	Cmode	TR2	TR1	Sp3	Sp2	Sp1
0	1	1	1	1	1	1	1

· Pn071 parameter:

bit	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
function signal	REF	GOH	PC	INH	Pclear	Cinv	Gn2	Gn1
Defaults	1	1	1	1	1	1	1	1

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
reserve	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, you can achieveCN2The effect of external input signal control. For example: drive in In position control mode, to prohibit pulse command, setPn071ofBIT4set up0, the input pulse becomes invalid. Under non-communication control, Setting this parameter value is invalid.

Notice:After each power-up, the driver will automatically load thePn070, Pn071Register value, and perform the corresponding operation immediately. So, after enabling Before connecting the motor, make sure that the input function signal enters the correct working state.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn072	Input function control mode selection register 3	0~1	0		all
Pn073	Input function logic state setting register 3	0~1	1		all

- Pn072 parameters:

bit	BIT15~BIT1	BIT0
Function	reserve	Sen
Defaults	0	0

· Pn073 parameter

bit	BIT15~BIT1	BIT0
function signal	reserve	Sen
Defaults	0	1

serial number	name	Ranges	Defaults	unit	Be applicable
Pn074	fan on temperature	30~70	50	℃	all
Pn075	How the fan works	0~2	0		all

Pn075	How the fan works
0	Temperature sensing automatic operation
1	Start up and run
2	closure

serial number	name	Ranges	Defaults	unit	Be applicable
Pn076	Emergency stop (EMG) reset method Mode	0-1	0		all

After the EMG state is released from OFF, the conditions for clearing the EMG (AL-14) alarm:

Settings	Function
0	Must be under servo enable OFF, through manual or port SigIn: AlarmRst cleared.
1	No matter the servo enable is ON or OFF, EMG turns ON again, will be cleared automatically.

· In the state of enabling ON, if there is an external command input, the command will be executed immediately after the EMG alarm is automatically cleared.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn077	Forward/reverse drive prohibition detection	0-2	0		all

If ccwl or cwl function is used, when ccwl or cwl is OFF, you can set whether to send AL-15 alarm:

Settings	Function
0	No alarm, decelerate and stop.
1	When the motor is running, after decelerating and stopping, an alarm is issued, and the motor No longer power on.
2	An alarm is issued immediately, the motor is powered off, and the machine stops freely.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn078	Insufficient voltage detection	0~1	1		all

Settings	Function
0	not checked out
1	check out

serial number	name	Ranges	Defaults	unit	Be applicable
Pn079	System status display item selection select	0-30	0		all

After the drive is powered on, it automatically enters the submenu of the monitoring mode menu Dn000. By default, by manufacturer

The system status (motor speed) can be displayed in the same way, and the user can set the value of this parameter to make Dn000 display a specific

For the system status parameters, please refer to "Monitoring Mode List" for details.

0 System default (motor running speed) 1 Speed command 2 Average torque

3 Position deviation 4 AC mains voltage 5 Maximum instantaneous torque

6 pulse input frequency 7 heat sink temperature 8 current motor running speed

9 The low bit of the cumulative value of valid input command pulses

10 Valid input instruction pulse cumulative value high bit

11 During position control, the low bit of the cumulative value of the encoder's effective feedback pulses

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

13 Regenerative braking load ratio

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 the servo is powered on, the encoder feedback pulse accumulation value is low

20 After the servo is powered on, the encoder feedback pulse accumulation value is high

21 Driver software version 22 Encoder UVW signal 23 Rotor absolute position 24 Driver model

25 Absolute encoder single-turn data low bit 26 Absolute encoder single-turn data high bit

27 Absolute encoder multi-turn data low bit 28 Absolute encoder multi-turn data high bit

30 Load inertia ratio display

serial number	name	Ranges	Defaults	unit	Be applicable
Pn080	Incremental encoder lines	0~16000	0	Wire	all
	• Number of encoder lines mounted on the motor shaft. The setting value must be exactly the same as the nominal value of the number of lines specified by the encoder. The angle and wiring of the motor installed with the encoder conform to the wiring definition of the driver, otherwise the motor will be stuck, run away or There are abnormal phenomena such as deviations in the execution of position commands. General users do not need to modify this parameter, the default value is sufficient. like The encoder is an absolute encoder, and this parameter setting is invalid. · When the value is 0, it is the linear value of the standard encoder of the motor.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn081	User parameter permanent write operation	0-1	0		all
	Corresponds to Fn001 operation in auxiliary mode. Write all the current parameter values of Pn000~Pn219 into EEPROM. When the parameter value changes from 0 to 1, the drive will perform a write operation. This operation is only valid when communicating (Pn064>0).				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn082	SigOut port forced output	0~4095	0		all

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

	reserve	SigOut5	SigOut4		SigOut3		SigOut2		SigOut1	
bit	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-compulsory state	0	0	non-compulsory state
0	1	Forced high power flat	0	1	forced high

1	0	forced low battery flat	1	0	forced low
1	1	non-compulsory state	1	1	non-compulsory state

SigOut4			SigOut3		
BIT7	BIT6	output level	BIT5	BIT4	output level
0	0	non-compulsory state	0	0	non-compulsory state
0	1	forced high	0	1	forced high
1	0	forced low	1	0	forced low
1	1	non-compulsory state	1	1	non-compulsory state

SigOut5		
BIT9	BIT8	output level
0	0	non-compulsory state
0	1	forced high
1	0	forced low
1	1	non-compulsory state

Example: The output port SigOut2 is forced to output low level, and other port states are not forced to output, then set the value of Pn082 parameter to 8.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn083	Low voltage alarm detection amplitude	50~280	200	V	all
	When the bus voltage is lower than this range, Pn078 determines whether to send an alarm.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn084	High temperature alarm detection amplitude	0~100	70	Celsius -	all
	When the heat sink temperature is higher than this level, an alarm will be issued. If set to 0, the alarm will be shielded.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn085▲	Number of motor pole pairs	0~100	0	right	all
	When the parameter is 0, it is the default value of the drive.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn087▲	Selection of braking resistor	0~2	1	-	all

Settings	Function
0	Braking resistor not installed
1	Use built-in braking resistor
2	Use an external braking resistor

serial number	name	Ranges	Defaults	unit	Be applicable
Pn088	Braking resistor regeneration overload alarm Police level	50~250	90	%	all

· The higher the regenerative overload rate of the braking resistor, the higher the surface temperature of the resistor.

· When the built-in or external braking resistor regenerative braking load rate is lower than the alarm level, no overload alarm will be issued.

· Set Pn092=0 to disable regeneration overload alarm.

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serial number	name	Ranges	Defaults	unit	Be applicable
Pn089▲	Power of external braking resistor	20~20000	100	W	all
Pn090▲	Resistance value of external braking resistor	10~1000	100	-	all
Pn091	External braking resistor regeneration can capacity	5~75	20	%	all

· When using an external braking resistor (Pn087=2), the nominal resistor power value and resistance value must be set.

· When setting the available capacity of the braking resistor, heat dissipation factors such as ambient temperature, ventilation intensity, and resistance heat dissipation characteristics must be considered.

Resistors should be derated. The usable capacity of the braking resistor should not be too high, otherwise the temperature rise on the surface of the resistor can reach hundreds of degrees Celsius.

Burn out the resistor and cause a fire. Please select braking resistor under safe conditions. When the braking resistor is installed on a large radiator

When using natural cooling, you can try to set it at 25%, and if you have strong wind blowing, you can try to set it at 45%. system action

After a period of time, check whether the temperature of the resistor is too high. After several attempts, the regeneration overload alarm still occurs, and the resistance temperature

If the speed is within the allowable range, you can set Pn092=0, that is, disable the alarm related to the braking resistor.

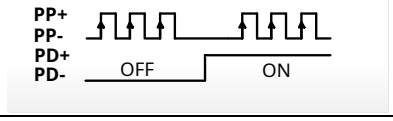
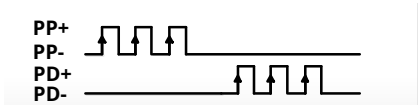
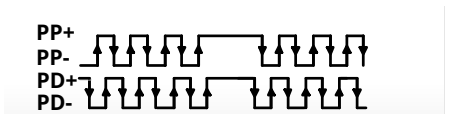
serial number	name	Ranges	Defaults	unit	Be applicable
Pn092	Brake resistor overload detection	0~1	1	-	all

Settings	Function

0	When regeneration is overloaded, no alarm will be issued
1	When the regeneration is overloaded, an alarm will be issued

4.3.2 Position Control Parameters

serial number	name	Ranges	Defaults	unit	Be applicable
Pn096▲	Command pulse input method	0-2	0		P

Pn096		Positive command	Negative order
0	pulse+direction		
1	Forward / reverse pulse		
2	quadrature pulse		

serial number	name	Ranges	Defaults	unit	Be applicable
Pn097▲	Command pulse input direction logic choose	0-1	0		P

Settings	Function
0	Input a positive command, the motor rotates counterclockwise (ccw)
1	Input a positive command, the motor rotates clockwise (cw)

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serial number	name	Ranges	Defaults	unit	Be applicable
Pn098	Pulse electronic gear ratio child 1	1~32767	1		P
Pn099	Pulse electronic gear ratio sub 2	1~32767	1		P
Pn100	Pulse electronic gear ratio sub 3	1~32767	1		P
Pn101	Pulse electronic gear ratio sub 4	1~32767	1		P
Pn102▲	Pulse electronic gear ratio mother	1~32767	1		P

The numerator N of the electronic gear ratio is determined by the GN1 and GN2 of the input port SigIn. The denominator is fixed. Molecular selection is as follows surface:

GN2	GN1	Electronic gear ratio numerator N
OFF	OFF	Molecule 1
OFF	ON	Molecule 2
ON	OFF	molecule 3
ON	ON	Molecule 4

serial number	name	Ranges	Defaults	unit	Be applicable
Pn103	Position deviation out of range setting Certainly	1~2000	500	million pulses	P

When the number of pulses of the pulse deviation counter exceeds the set value (that is: the difference between the current position and the target position is too large), the drive will send out an alarm signal.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn104	Location positioning complete range setting Certainly	0~ 32767	10	pulse	P
Pn105	Position positioning completed hysteresis setting Certainly	0~ 32767	3	pulse	P

When the remaining pulse number of the deviation counter is lower than the set value of this parameter, the output port SigOut::Preach signal number is ON, otherwise OFF.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn106	Positioning proximity range setting Certainly	0~ 32767	300	pulse	P
Pn107	position positioning proximity hysteresis Certainly	0~ 32767	30	pulse	P
	When the remaining pulse number of the deviation counter is lower than the set value of this parameter, the Pnear of the output port SigOut The signal is ON, otherwise OFF.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn108	Position deviation clearing method	0-1	1		P

During position control, the Pclear function of SigIn can be used to clear the value of the position deviation counter. Offset

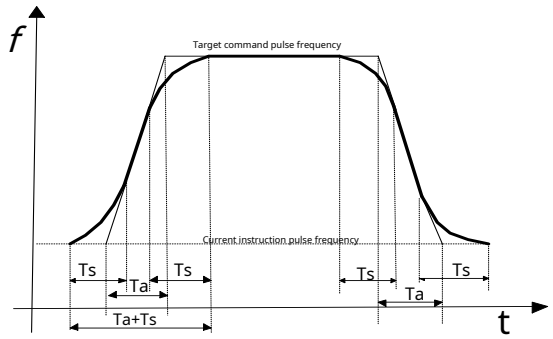
Poor Except occurs in:

Settings	Function
0	Pclear level ON period
1	Pclear rising edge time (from OFF to ON)

serial number	name	Ranges	Defaults	unit	Be applicable
Pn109◆	Acceleration and deceleration mode of position command	0-2	0		P

Settings	Function
0	no filtering
1	smoothing filter
2	S-shaped filtering

serial number	name	Ranges	Defaults	unit	Be applicable
Pn110◆	Position command primary filter time	5~500	50	ms	P

	constant				
Pn111◆	Position command S-shape filter time Constant Ta	5~340	50	ms	P
Pn112◆	Position command S-shape filter time Constant Ts	5~150	20	ms	P
	· Filtering time constant definition: the time from the current position command frequency to the target command frequency. The filter time is more Longer, the smoother the frequency smoothness of the position command, but the greater the command response delay. Step change in command pulse frequency In some cases, it plays the role of smooth running motor. Filtering has no effect on the number of command pulses. · Filter time T=Ta+Ts. Ta: The linear part of the time, the smaller the Ta, the faster the acceleration and deceleration. Ts: arc part time, The larger Ts is, the smoother the speed and the smaller the impact.  Set rules: $\frac{Ta}{2} \geq Ts$				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn113	Position loop feedforward gain	0-100	0	%	P
Pn114▲	Position loop feedforward filter time constant	1-50	5	ms	P
	During position control, the position feedforward is directly added to the speed command, which can reduce the position tracking error and improve the response. If the feedforward gain is too large, it may cause speed overshoot. Feedforward commands can be smoothed.				

serial number	name	Ranges	Defaults	unit	Be applicable
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 generate vibration or noise, increase the gain value of the position loop to speed up the response and shorten the				

	Short positioning time.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn117	Position command source selection	0~3	0		P

Settings	Function
0	External pulse input
1	internal position command (seeAppendix G)
2	The instruction source is determined by SigIn:psource. On: internal position command; Off: external pulse input
3	Motion Controller Instructions

serial number	name	Ranges	Defaults	unit	Be applicable
Pn118	Internal position command pause mode choose	0~1	0		P

Settings	Function
0	After pstop triggers the action, when ptriger triggers again, the drive will The currently selected internal position instruction runs.
1	When pstop triggers the action and ptriger triggers again, the driver will continue to complete the last remaining internal position command pulses.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn119	Internal position pause deceleration time	0~10000	50	ms	P
	In internal position control, after the falling edge of pstop appears, the motor will decelerate from the current running speed to 0. The time can be set by this parameter (only for internal position control).				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn120	Pulse number of internal position command 0 high setting	- 9999~9999	0	million pulses	P
Pn121	Pulse number of internal position command 0	- 9999~9999	0	indivual	P

	Low setting				
Pn122	Pulse number of internal position command 1 high setting	- 9999~9999	0	million pulses	P
Pn123	Pulse number of internal position command 1 Low setting	- 9999~9999	0	indivual	P
Pn124	Number of internal position command 2 pulses high setting	- 9999~9999	0	million pulses	P
Pn125	Number of internal position command 2 pulses Low setting	- 9999~9999	0	indivual	P
Pn126	Internal position command 3 pulses high setting	- 9999~9999	0	million pulses	P
Pn127	Internal position command 3 pulses Low setting	- 9999~9999	0	indivual	P
	Internal position command N (pulse amount) = internal position command N pulse number high setting value × 10000 + internal bit Set command N pulse number low bit set value Example: The encoder has 2500 lines, and the travel distance is 12.5 revolutions, then set Pn120=12, Pn121=5000.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn128	Internal position command 0 Running speed Spend	0~3000	100	r/min	P
Pn129	Internal position command 1 running speed Spend	0~3000	100	r/min	
Pn130	Internal position command 2 running speed Spend	0~3000	100	r/min	P
Pn131	Internal position command 3 running speed Spend	0~3000	100	r/min	P
	When executing the internal position command N, limit the maximum speed that the motor can run.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn132	Torque/speed control switches to	0~1	0		P

	way of position control				
	In dual-mode control, when the control mode is switched from torque or speed mode to position control (Pn002=3 or 4), it is Avoid severe mechanical shocks and switch at lower speeds. Conditions for switching can be set: Settings: 0 = Zero speed (zerospeed); 1 = slow down to zero				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn133	Torque/speed control switches to Deceleration time of position control	5-10000	100	ms	P
	When Pn132=1, when the cmode signal is valid, it indicates that the control mode is switched from torque or speed control to position control, The motor first decelerates to zero and then switches to position control mode. See the specific timing for detailsAppendix B .				

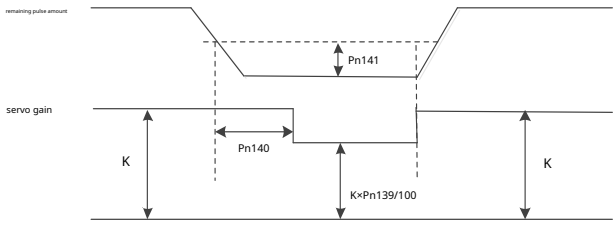
serial number	name	Ranges	Defaults	unit	Be applicable
Pn134	Fixed length displacement direction	0~1	0		P
	When moving at a fixed length, before the SigIn:Pdistance trigger is valid, the direction of the motor rotation needs to be determined: · 0: Determine the direction of fixed-length displacement rotation according to the current motor running speed. Current speed ≥ 0, fixed length displacement positive Rotation (CCW); current speed < 0, fixed-length displacement reverse (CW). · 1 : Determine the direction of fixed-length displacement rotation according to the current motor running speed. Current speed > 0, fixed length displacement positive Rotation (CCW); current speed ≤ 0, fixed-length displacement reverse (CW).				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn135	Fixed length displacement high position	0~9999	0	ten thousand	P
Pn136	Fixed length displacement low position	0~9999	100	indivual	P
	When the SigIn:Pdistance trigger is valid, the motor shaft will rotate the distance: Pn135*10000+Pn136 (a pulse). The moving direction of the motor is determined by Pn134.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn137	fixed length maximum running speed	10~5000	200	r/min	P

	During the execution of fixed-length process, the maximum speed that the motor is allowed to run.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn138	Fixed-length lock release method	0~1	1		P
	After the fixed-length displacement is executed, the motor is in the fixed-length locked state, which is a normal response to the position command. There are two kinds of Cancellation method: · 0: No lock release signal is needed, and the position command will be responded immediately after the fixed-length displacement is completed. · 1: Wait for the input port signal SigIn:Punlock signal to be valid before responding to the position command.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn139	Vibration suppression attenuation ratio at stop	10~100	100	%	P
Pn140	Vibration suppression waiting time at stop	0~30000	300	ms	P
Pn141	Vibration suppression condition at stop	0~10000	10	pulse	P
	After the servo gain is increased to a considerable extent, although vibration does not occur when moving, it may occur after stopping move. This function works only when the servo is stopped, and suppresses vibration by reducing the servo gain.  From the time when the position command transmission stops, when the remaining pulse amount is lower than the Pn141 setting value, wait for the Pn140 setting time and then attenuate the internal servo gain. Please set the suppression attenuation ratio above 50%. If you set a low value, the responsiveness may decrease and vibration may occur.				

4.3.3 Speed control parameters

serial number	name	Ranges	Defaults	unit	Be applicable
Pn146◆	Acceleration and deceleration mode of speed command	0~2	1		S

Settings	Function
0	No acceleration and deceleration
1	S curve acceleration and deceleration
2	Linear acceleration and deceleration

In speed control mode and external position loop, this parameter should be set to 0.

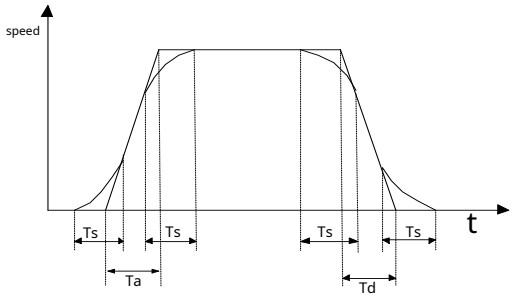
serial number	name	Ranges	Defaults	unit	Be applicable
Pn147◆	Speed command S curve acceleration and deceleration Time constant Ts	5~ 1500	80	ms	S
Pn148◆	Speed command S-curve acceleration Interval constant Ta	5~ 10000	80	ms	S
Pn149◆	Speed command S-curve deceleration Interval constant Td	5~ 10000	80	ms	S

In the speed control mode, the acceleration and deceleration time of the speed command can be set to start the servo motor smoothly move and stop.

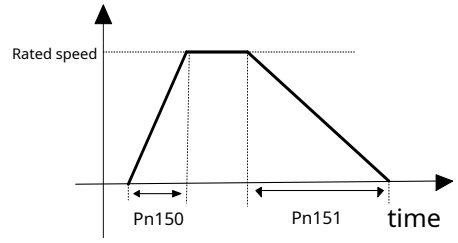
· Ta: Acceleration time: the time to reach the rated speed from 0r/min. For example, the servo motor rated speed 3000r/min, if the setting time is 3S, the time to accelerate from 0r/min to 1000r/min is 1S.

Td: deceleration time: the time from rated speed to 0r/min

Ts: time of the arc portion



Set rules: $Ta \geq Ts$, $\frac{Td}{2} \geq Ts$

serial number	name	Ranges	Defaults	unit	Be applicable
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 when the speed command rises from zero to the rated speed. 				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn152▲	Speed detection filter time constant	1~380	1	0.1ms	all
	The larger the parameter value, the smoother the detected speed, but the slower the speed response. Too large is easy to cause oscillation, too small May cause noise.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn153	Speed Regulator Proportional Gain 1	1~ 2000	80	Hz	all
Pn154	Speed regulator integral time constant 1	1~ 5000	150	0.1ms	all
Pn155	Speed Regulator Proportional Gain 2	1~ 2000	80	Hz	all
Pn156	Speed regulator integral time constant 2	1~ 5000	150	0.1ms	all
	· The gain of the speed loop regulator directly determines the response bandwidth of the speed control loop, before the mechanical system does not generate vibration or noise Under the condition of increasing the speed loop gain value, the speed response will be accelerated. · The integral time constant is used to adjust the compensation speed of the steady-state error, reduce the parameter value, reduce the speed control error, and increase the rigidity. Too small will easily cause vibration and noise.				

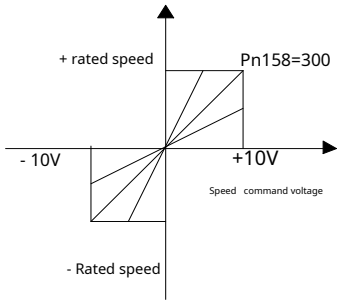
serial number	name	Ranges	Defaults	unit	Be applicable
Pn157▲	Analog speed command smoothing filter time	1~500	1	0.1ms	S
	The larger the setting value, the slower the response speed of the input analog quantity, which is beneficial to reduce high-frequency noise interference; the smaller the setting value, the slower the response speed. The speed is faster, but the interference noise will become larger.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn158	Analog speed command gain	1~1500	300	r/min/V	S

The proportional relationship between the analog speed command input and the actual running speed of the motor. Voltage input range -10~10V. count

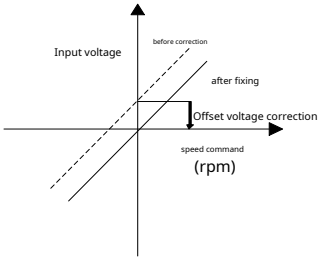
Calculation formula: speed = input voltage * Pn158. For example: when the input voltage is 10V, if it is set to 300, the corresponding speed is

10*300=3000r/min.



serial number	name	Ranges	Defaults	unit	Be applicable
Pn159	Analog speed command offset adjustment	- 5000~5000	0	mv	S

· There may be an offset phenomenon in the input analog quantity, which can be compensated by this parameter.



· Automatic offset adjustment, Fn008 operation can be performed.

· Manual offset adjustment steps are as follows:

1: Connect the external 0 potential to the analog input port,

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

3: If the observed value is not 0, input a negative observed value into this parameter to realize the adjustment (note that the voltage unit conversion is off

Tie).

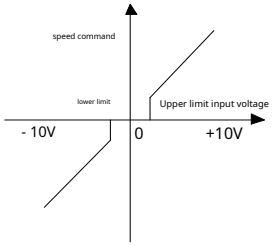
Example: dn17=1.12V, Pn159 input -1120mv is enough.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn160	Analog speed command direction	0-1	0		S

Settings	Function
0	Positive voltage forward (ccw), negative voltage reverse (cw)
1	Negative voltage forward (ccw), positive voltage reverse (cw)

serial number	name	Ranges	Defaults	unit	Be applicable
Pn161	The upper limit of the forced zero range of the analog speed command	0~1000	0	10mv	S
Pn162	The lower limit of the forced zero range of the analog speed command	- 1000~0	0	10mv	S

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



· The input voltage at this time is the input voltage after the PN159 offset adjustment.

· By setting the upper and lower limits, the input command can be changed into unipolar or bipolar command. Example: set the upper limit to 0 and the lower limit to - 1000, it means that the input command range is 0~10V, which is a positive polarity speed command.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn163	Zero speed clamp locking method	0-1	0		S

· 0: When locked, when the clamping mode is position loop control, intervene in the internal loop setting loop control, and set the gain through Pn167.

1: When locked, the clamping method is speed loop control, the speed command is forced to be 0, and the position may change due to external force. Change.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn164	Zero speed clamp trigger mode	0~1	0		S

Settings	Function

0	SigIn port ZeroLocK is ON
1	Triggered when the speed command is lower than the Pn165 parameter

serial number	name	Ranges	Defaults	unit	Be applicable
Pn165	Zero Speed Clamp Level	0~200	6	r/min	S
	When Pn164 is set to 1 and the speed command is lower than the value of this parameter, the motor shaft will be locked. Example: This parameter setting is 10r/min, if the analog speed command is within the range of -10r/min~10r/min, the deceleration clamp will be performed to prevent The analog speed command drifts around zero, causing the motor shaft to become unstable.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn166	Zero speed clamp deceleration time	5~10000	50	ms	S
	When the zero-speed clamp is triggered, it will immediately decelerate to zero according to the deceleration time, and then lock.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn167	Internal Position Regulator Gain	1-2000	100	1/S	all

serial number	name	Ranges	Defaults	unit	Be applicable
Pn168	Speed command source selection	0~2	0		S

In the speed control mode, the optional source of speed command:

Settings	Function
0	External analog speed command + internal speed 2~8
1	Internal speed 1 ~8
2	Motion controller analog voltage command

serial number	name	Ranges	Defaults	unit	Be applicable
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 control mode of the drive is in the speed control mode, the source of the speed command is from the input port SigIn

SP1, SP2, SP3 decide:

SP3	SP2	SP1	speed command
0	0	0	Internal Speed 1/External Analog speed command (by Pn168 decision)
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 means OFF, 1 means ON.

Note 2: If the SigIn port does not specify SP3, SP2, SP1 functions, they are all OFF by default.

serial number	name	Ranges	Defaults	unit	Be applicable
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
	During jog trial run, the speed and acceleration and deceleration time of the motor can be set.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn182	Speed loop PDFF control coefficient	0~100	100	-	P.S.
	This parameter determines the control structure of the speed loop. When Pn182=100, it is PI control structure; when Pn182=0, it is IP control.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn183~	Speed Feedback Compensation	0~100	0	%	P.S.
	Compensate the feedback speed, the larger the compensation value, the louder the motor noise.				

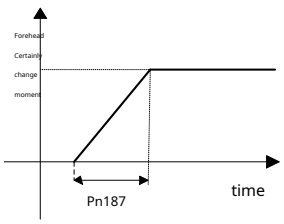
4.3.4 Torque Control Parameters

serial number	name	Ranges	Defaults	unit	Be applicable
Pn186	Acceleration and deceleration mode of torque command	0~1	0		T

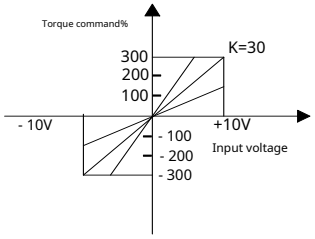
Settings	Function
0	Acceleration and deceleration without torque command
1	Linear acceleration and deceleration using torque command

serial number	name	Ranges	Defaults	unit	Be applicable
Pn187▲	Torque command linear acceleration and deceleration Interval constant	1~30000	1	ms	T

The time constant is defined as the time when the torque command rises linearly from zero to the rated torque.



serial number	name	Ranges	Defaults	unit	Be applicable
Pn188▲	Analog torque command smooth filtering time	1~500	5	0.1ms	T
	The larger the setting value, the slower the response speed of the input analog quantity, which is beneficial to reduce high-frequency noise interference; the smaller the setting value, The faster the response speed, but the greater the interference noise.				

serial number	name	Ranges	Defaults	unit	Be applicable
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. Range of voltage input - 10~10V. The default input voltage is 10V, and the motor reaches 3 times the rated torque, that is, Y=KX=30X, K=30. 				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn190	Analog torque command offset adjustment	- 1500~1500	0	mv	T
	For the adjustment method, refer to "Analog Speed Command Offset Adjustment"				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn191	Analog torque command direction	0-1	0		T

Settings	Function
0	Positive voltage forward (ccw), negative voltage reverse (cw)
1	Negative voltage forward (ccw), positive voltage reverse (cw)

serial number	name	Ranges	Defaults	unit	Be applicable
Pn192	Torque Q axis regulator proportional gain 1	5~ 2000	100	%	all
Pn193	Torque Q-axis regulator integral time constant 1	5~ 2000	100	%	all
Pn194	Torque Q axis regulator proportional gain 2	5~ 2000	100	%	all
Pn195	Torque Q-axis regulator integral time constant 2	5~ 2000	100	%	all
	· Increase the proportional gain to speed up the Q-axis current response. · Decreasing the integral time constant can reduce the Q-axis current control error.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn196	Torque command filter time constant 1	1~5000	40	0.01ms	all
Pn197	Torque command filter time constant 2	1~5000	40	0.01ms	all
	It can suppress mechanical vibration. The larger the setting value, the better the effect. If it is too large, the response will slow down and may cause oscillation; The smaller the setting value, the faster the response, but limited by mechanical conditions.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn198	Speed limit during torque control	0~4500	2500	r/min	T
	During torque control, the running speed of the motor is limited within the range of this parameter. It can prevent overspeed phenomenon under light load. When overspeed occurs, speed control is involved to reduce the actual torque, but the actual speed will have a slight error.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn199	Torque Control Limited Speed Source choose	0~2	0		T

Settings	Function
0	It is limited by parameter Pn198.
1	It is limited by internal speed command 1~8.
2	If Pn204=1, that is, all torque commands come from internal torque commands, then the speed The speed can be limited by the analog voltage speed command.

· All the above speed limit values are not divided into positive and negative, if multiple speed limits occur, they are limited by the minimum speed.

· If this parameter is set to 1, it is limited by the internal speed command, and the limited speed value is determined by sp1, sp2, sp3:

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

0 means OFF, 1 means ON.

· Even if the above parameter setting value exceeds the maximum speed allowed by the system, the actual speed will be limited to the maximum speed Down.

serial number	name	Ranges	Defaults	unit	Be applicable
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 the internal torque control mode is selected, use TR1 and TR2 of the input port SigIn to select 4 kinds of torque commands:

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

Note 1: 0 means OFF, 1 means ON

Note 2: If the SigIn port does not specify TR2 and TR1 functions, they are both OFF by default.

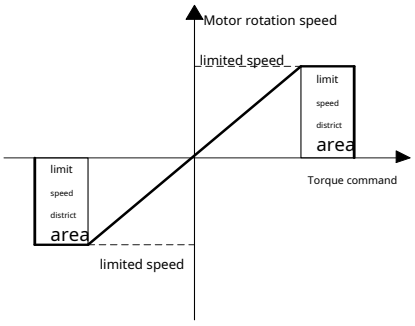
serial number	name	Ranges	Defaults	unit	Be applicable
Pn204	Source of torque command	0~2	0		T

Settings	Function
0	External analog torque command.
1	Internal Torque 1.
2	Motion controller analog voltage finger make.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn205	Torque D-axis regulator proportional increase beneficial	5~2000	100	%	all
Pn206	Torque D-axis regulator integral time Interval constant	5~2000	100	%	all
	In space vector modulation, the proportional gain and integral time constant of the regulator of the torque D axis.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn207	Speed feedback adjustment coefficient	1~3000	100		T

During torque control, if the motor speed is outside the limited speed range, speed feedback is involved to reduce the actual torque. So that the speed returns to the limit speed range. The smaller the parameter setting, the larger the feedback, the faster the adjustment, and the speed limit The smaller the difference, but too small may cause the motor to shake; the parameter setting is too large, the slower the adjustment, the speed may have been exceeded, No speed limit effect. The actual speed will be slightly higher than the limit speed value.



serial number	name	Ranges	Defaults	unit	Be applicable
Pn208	Tracking torque command judgment error range 1	0~300	5	%	T
Pn209	Tracking torque command judgment error range 2	0~300	2	%	T
	For the TCMDreach signal output of the SigOut port to be valid, the following conditions must be met: Condition 1: The torque command set by the host computer must be within the judgment error range 1. Example: 80% of the input torque command, Pn208 is set to 5%, and the drive internally performs acceleration and deceleration calculations on the input torque command. When the output torque command is within the range of 75%~85%, condition 1 is satisfied. Condition 2: The difference between the detected actual motor torque and the input torque command is within the judgment error range 2.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn210	Judgment time of speed limit output	0~2000	15	ms	T
	In torque control mode, when the motor speed exceeds the maximum speed limit value, the speed limit will continue within the judgment time When active, the SPL function signal output of the SigOut port is ON to reduce frequent inversion of the signal.				

4.3.5 Extended Control Parameters

serial number	name	Ranges	Defaults	unit	Be applicable
Pn216▲	Absolute Encoder Usage Options	0~1	1		all

Settings	Function
0	Singleturn Absolute Encoder
1	Multiturn Absolute Encoder
2	Motion controller analog voltage finger make.

When there is no external battery, the encoder cannot save multi-turn information, and this parameter should be set to 0 at this time.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn217	Absolute encoder output lines	16~16384	2500	Wire	all
	· Pulses sent from the servo unit to the outside. The higher the number of output lines, the highest output frequency of A, B quadrature pulse signal (Max=1.6Mhz) is also higher, the higher the requirements for the host computer pulse receiving circuit. Poor receiving circuits will pulse missing phenomenon. · By default, Pn217=2500, that is, the motor rotates one circle, and the servo unit outputs 2500*4=10000 pulses.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn218	Absolute encoder absolute position data transmission method	0~1	0		all

When Pn216 is set to 1, the multi-turn data information of the absolute encoder is used, and the absolute encoder is equipped with electric

At this time, the correct multi-turn absolute position information will be output; if Pn216 is set to 0, the output multi-turn position information will be 0.

See "Chapter 10 Use of Absolute Servo Unit" for details.

Settings	Function
0	Incremental way to output multi-turn absolute position information and single-turn absolute position information
1	Digital encoding method to output absolute position information and single-turn absolute position information

serial number	name	Ranges	Defaults	unit	Be applicable
Pn219	Absolute encoder multi-turn overflow detection	0~1	1		all

When used as a multi-turn absolute encoder, if the motor always runs in one direction, it may cause multi-turn data overflow.

out. This parameter can be set to close the multi-turn overflow alarm.

Settings	Function
0	Multi-turn overflow alarm is not detected
1	Multi-turn overflow alarm detection

serial number	name	Ranges	Defaults	unit	Be applicable
Pn234	Pulse command maximum frequency	20~2000	550	KHZ	P
	When the command pulse frequency exceeds the set value, the drive will send out an alarm.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn235	Pulse command digital filter time	0~255	0	100ns	P

· Perform digital filtering on the input command pulse to filter out the noise on the signal line.

· The longer the setting time is, the lower the maximum pulse frequency will be. The default setting value of the system allows to receive the highest frequency of 550KH. filtering

There must be a certain margin in the time, otherwise the phenomenon of missing pulses may occur.

Translated from Chinese (Simplified) to English - www.onlinedoctranslator.com

serial number	name	Ranges	Defaults	unit	Be applicable
Pn236	Absolute encoder forward soft forbidden multi-turn value	0~32000	0	lock up-	all
Pn237	Absolute encoder forward soft prohibition single-turn value	0~10000	0	0.0001 turns	all
Pn238	Absolute encoder reverse soft prohibition multi-turn value	0~32000	0	lock up	all
Pn239	Absolute encoder reverse soft prohibition single-turn value	0~10000	0	0.0001 turns	all
	When using the multi-turn function of the encoder for the servo motor with absolute encoder (Pn216=1), you can use the software drive to disable stop function. The soft prohibition function is equivalent to the drive prohibition function triggered by the external port (CCWL, CWL), which can cooperate with P007, Pn077 parameter used. When the parameter is set to 0 (the default value), the soft prohibition function is invalid; otherwise, when the number of revolutions of the motor reaches the set value, The soft disable function will be triggered. Example: Pn236=100, Pn237=5000, when the motor forward rotation exceeds When 100+5000*0.0001=100.5 turns, trigger the drive prohibition function.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn257	Load moment of inertia ratio	0~100.00	1.00	times	P.S.
	Load moment of inertia ratio $\frac{\text{Moment of inertia converted from motor shaft}}{\text{Rotor moment of inertia}}$. When leaving the factory, it is assumed that the servo motor has a double load state of inertia.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn258	Gain adjustment mode	0~1	0	-	P.S.

Settings	Function
0	Manual gain adjustment.
1	Automatic gain adjustment, the adjustment method is detailed in the "Operation and Adjustment" chapter.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn259	Rigidity level selection	0~20	5	-	P.S.
	The higher the rigidity level, the faster the servo response, but too high rigidity level will cause the motor to vibrate, the setting method is detailed in " Operation and Adjustment" chapter.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn260	Inertia real-time estimation method	0~1	0	-	all

Settings	Function
0	Offline inertia estimation. Inertia identification is performed through Fn018 operation.
1	Online inertia estimation. When the motor is running, real-time estimation is performed, through Dn030 Check the load inertia ratio.

serial number	name	Ranges	Defaults	unit	Be applicable
Pn263◆	Inertia estimation acceleration and deceleration time	20~500	80	ms	all
Pn264◆	Inertia estimation allowable maximum speed	150~1000	400	r/min	all
Pn265◆	Inertia estimation pause time interval	0~10000	500	ms	all
Pn266◆	Inertia estimated inertia ratio estimated value	1.00~20.00	3.00	times	all
	For details, see the system inertia identification in the "Operation and Adjustment" chapter.				

serial number	name	Ranges	Defaults	unit	Be applicable
Pn267▲	Motor rated torque	0~32000	0	0.1Nm	all
Pn268▲	Motor maximum output torque	0~32000	0	0.1Nm	all
Pn269▲	Moment of inertia of motor rotor Jm	0~32000	0	Kg·M^2·10^-4	all
Pn270▲	motor speed	80~5500	80	r/min	all
	It must be set according to the parameters on the motor nameplate. Wrong parameter setting will affect the running performance of the motor, resulting in abnormal Normal rotation. By default, the value is selected according to the internal parameters of the driver.				

4.4 Detailed description of port functions

4.4.1 Detailed function of SigIn input port

serial number	symbol	Function	Function Description
0	NULL	no function specified	The drive does not take any action on the input status.
1	Son	Servo enable	OFF: The driver is not enabled and the motor is not powered. ON: The driver is enabled and the motor is powered on Note: It is determined by Pn003 parameter or Son state.
2	AlarmRst	alarm reset	When there is an alarm and the alarm can be cleared, the rising edge of the input signal (OFF to ON), the alarm is cleared.
3	CCWL	Forward drive prohibited	OFF: Forbid the motor to run forward ON: Allow the motor to rotate forward Note 1: If you want to use the forward drive prohibition function, first set Pn006 parameter, enable this function, and assign it to a specific input port. silent Yes, do not use this function. Note 2: When the motor is running normally, CCWL must be in the normally closed contact (ON state) Note 3: This function is invalid during homing.
4	CWL	Reverse drive prohibited	OFF: Prohibit the reverse rotation of the motor ON: Allow the motor to reverse
5	TCCW	External forward torque limit	OFF: Torque in CCW direction is not limited by Pn010 parameter ON: CCW direction torque is limited by Pn010 parameter Note: Regardless of whether TCCW is valid or invalid, the torque in CCW direction is also affected by Pn008 parameter limit.
6	TCW	External reverse torque limit	OFF: Torque in CW direction is not limited by Pn011 parameter ON: CW direction torque is limited by Pn011 parameter Note: Regardless of whether TCW is valid or invalid, the torque in CW direction is also affected by Pn009 parameter limit.
7	EMG	emergency shutdown	OFF: Prohibit the driver from driving the motor and cut off the motor current ON: Allow the driver to drive the motor normally
8	ZeroLock	zero speed clamp	During speed control:

<table>
<tr><td></td><td></td><td></td><td>OFF: Do not lock the motor shaft
ON : Lock the motor shaft</td></tr>
<tr><td>9</td><td>SP1</td><td>Internal speed command selection 1</td><td rowspan="3">When the control mode of the drive is in the speed control mode, the speed indicator
Let the source be determined by SP1, SP2, SP3 of SigIn:
<table>
<tr><th>SP3</th><th>SP2</th><th>SP1</th><th>speed command</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>Internal speed 1/ external simulation 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>
<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 means OFF, 1 means ON.
Note 2: If the SigIn port does not specify SP3, SP2, SP1 functions,
The default is OFF.</td></tr>
<tr><td>10</td><td>SP2</td><td>Internal speed command selection 2</td></tr>
<tr><td>11</td><td>SP3</td><td>Internal speed command selection 3</td></tr>
<tr><td>12</td><td>TR1</td><td>Internal torque command selection 1</td><td rowspan="2">When selecting the internal torque control mode, use the combination of TR1 and TR2,
4 torque commands can be selected.
<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 Turn 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 means OFF, 1 means ON
Note 2: If the SigIn port does not specify TR2 and TR1 functions, they are both OFF by default.</td></tr>
<tr><td>13</td><td>TR2</td><td>Internal torque command selection 2</td></tr>
<tr><td>14</td><td>Cmode</td><td>Control mode switching</td><td>When the parameter Pn002 is 3, 4, 5, the control mode can be switched.</td></tr>
<tr><td>15</td><td>C gain</td><td>gain switching</td><td>When the parameter Pn045 is 2, switch the gain combination through Cgain:
OFF: First gain</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td>ON: 2nd gain</td></tr>
<tr><td>16</td><td>Gn1</td><td>Electronic gear molecular selection 1</td><td rowspan="2">Through the combination of Gn1 and Gn2, select the electronic gear molecule 1~4
<table><tr><td>Gn2</td><td>Gn1</td><td>Electronic gear ratio numerator N</td></tr><tr><td>OFF</td><td>OFF</td><td>1st molecule</td></tr><tr><td>OFF</td><td>ON</td><td>2nd molecule</td></tr><tr><td>ON</td><td>OFF</td><td>3rd molecule</td></tr><tr><td>ON</td><td>ON</td><td>4th 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 negation</td><td>In speed or torque control mode, the speed or torque command is reversed.
OFF: normal command
ON: instruction inversion</td></tr>
<tr><td>19</td><td>Pclear</td><td>Position deviation clear</td><td>Clear the value of the position deviation counter, the clearing method is determined by the Pn108 parameter
Sure:<table><tr><td>Pn108</td><td>Way</td></tr><tr><td>0</td><td>Pclear level ON period</td></tr><tr><td>1</td><td>Pclear rising edge time (by OFF to ON)</td></tr></table></td></tr>
<tr><td>20</td><td>INH</td><td>Pulse input prohibited</td><td>OFF: Input command pulse is valid
ON : The input command pulse is invalid and ignored</td></tr>
<tr><td>twenty one</td><td>PC</td><td>proportional control</td><td>When the speed loop is a PI control structure (Pn182=100):
OFF: Speed loop PI control
ON: speed loop P control</td></tr>
<tr><td>twenty two</td><td>GOH</td><td>Origin return trigger</td><td rowspan="2">See Appendix F for details</td></tr>
<tr><td>twenty three</td><td>REF</td><td>Return to origin reference point</td></tr>
<tr><td>twenty four</td><td>Pos1</td><td>Internal position selection pos1</td><td rowspan="4">See Appendix G for details</td></tr>
<tr><td>25</td><td>Pos2</td><td>Internal position 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>suspend internal position command</td></tr>
<tr><td>28</td><td>Psource</td><td>Internal and external position command selection</td><td>When Pn117=2, the pulse command source can be determined by Psource:
OFF: External position command
On : internal position command</td></tr>
<tr><td>29</td><td>Pdistance</td><td>Fixed length displacement interrupt</td><td>When SigIn:Pdistance changes from On to Off, the drive will
Execute the fixed-length function.See Appendix H for details</td></tr>
<tr><td>30</td><td>Punlock</td><td>fixed length unlock</td><td>When Pn139=1, after executing the fixed length distance, the servo is in the fixed length</td></tr>
</table>

			Lock state, only when sigIn:Punlock changes from On to Off After that, the driver can respond to the position command normally.See Appendix H for details
31	Sen	absolute position request	It is used for the upper computer to read the absolute position information of the absolute encoder. See "Chapter 10 Use of Absolute Servo Units"

4.4.2 Detailed function of SigOut output port

serial number	symbol	Function	Function Description
0	null	no function specified	
1	alarm	Alarm detection	OFF: There is an alarm ON: no alarm
2	ready	servo ready	OFF: There is an alarm or failure ON: No alarm and failure
3	Emg	emergency stop detection	OFF: Not in emergency stop state ON : In emergency stop state
4	Preach	positioning complete	In position control mode, OFF: The position deviation is greater than the value set by parameter Pn104 ON: Position deviation is less than or equal to the value set by parameter Pn104
5	Sreach	Speed up	OFF: The speed is lower than the value set by Pn021 ON: The speed is greater than or equal to the value set by Pn021
6	Treach	reach the predetermined torque	OFF: The torque is less than the value set by Pn024 ON: The torque is greater than or equal to the value set by Pn024
7	Zero Speed	zero speed	OFF: The 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	Power up the servo motor	OFF: The motor is not powered ON: The motor is energized
9	BRK	Electromagnetic brake	OFF: Electromagnetic brake braking ON : Electromagnetic brake release
10	HOME	Return to origin completed	See Appendix F for details .
11	Pnear	positioning close	When in position control OFF: The position deviation is greater than the value set by parameter Pn106 ON: Position deviation is less than or equal to the value set by parameter Pn106
12	TRQL	Torque limit	OFF: Motor torque is not limited ON: Motor torque is limited

			When the torque command reaches Pn008, Pn009, Pn010, Pn011 TRQL is ON at the minimum parameter value in .
13	SPL	speed limit	During torque control, OFF: The motor speed has not reached the limit value ON: The motor speed has reached the limit value See Pn198, Pn199 instructions.
14	TCMDreach	Track torque command to reach	When in torque control: OFF: The motor torque has not reached the torque index set by the host computer. command value ON: The motor torque reaches the set torque index set by the host computer. command value Refer to the description of Pn208 and Pn209.

No.5Chapter Monitoring Parameters and Operation

5.1Monitoring Panel Operations

For details, see Chapter 3 "Monitor Mode Operation ".

5.2List of monitoring parameters

serial number	illustrate
dn-00	Monitor display options (the default is the motor running speed), by settingPn079parameter to makedn-00show no the same monitoring status.
dn-01	Speed command (unit:r/min)
dn-02	Average torque (unit: %)
dn-03	Position deviation (-9999~9999)(unit: PCS)
dn-04	AC mains voltage (unit: volts)
dn-05	Maximum instantaneous torque (unit: %)
dn-06	Pulse input frequency (unit:KHZ)
dn-07	Heat sink temperature (unit: ℃)
dn-08	Current motor running speed (unit:r/min)
dn-09	The low bit of the cumulative value of effective input command pulses (-9999~9999)(unit: PCS)
dn-10	Valid input command pulse cumulative value high (-5000~5000) (unit: 10,000) out±5000, then the high position0, low bit unchanged, recount)
dn-11	During position control, the low bit of the cumulative value of the encoder's effective feedback pulses (-9999~9999)(unit: PCS)
dn-12	During position control, the high bit of the cumulative value of the encoder's effective feedback pulses (-5000~5000) (unit: ten thousand) (inverse Feed pulse cumulative value high bit exceeds±5000, then the high position0, low bit unchanged, recount)
dn-13	Regenerative braking load factor
dn-14	Input port signal status, from left to right:SigIn1~SigIn10(The upper part of the digital tube is bright: high level; The lower half is bright: low level)
dn-15	Output port signal status, from left to right:SigOut1~SigOut5(The upper half of the digital tube is on: high power flat; the lower part is bright: low level)
dn-16	When the motor is enabled, the analog torque command voltage (unit: volt)

dn-17	When the motor is enabled, the analog speed command voltage (unit: volt)
dn-18	Output Function Status Register
dn-19	After the servo is powered on, the cumulative value of the feedback pulse of the motor is low (-9999~9999)(unit: PCS)
dn-20	After the servo is powered on, the cumulative value of the feedback pulse of the motor is high (-5000~5000) (unit: ten thousand) (feedback pulse The high bit of accumulated value exceeds±5000, then the high position0, low bit unchanged, recount)
dn-21	Driver software version
dn-22	EncoderUVWSignals from left to right areUVWThe level state of the signal (1: high level;0: low level) (incremental encoder)
dn-23	Rotor absolute position (incremental encoder)
dn-24	Drive model
dn-25	Absolute encoder single-turn data low bit (0~9999)(unit: PCS)
dn-26	Absolute encoder single-turn data high bit (0~9999)(unit: ten thousand)
dn-27	Absolute encoder multi-turn data low bit (-9999~9999)(unit: circle)
dn-28	Absolute encoder multi-turn data high bit (-9999~9999)(Unit: 10,000 circles)
dn-30	Load moment of inertia ratio

Note: The Dn-18 output function status register is the functional logic status of the SigOut port, and each bit is shown in the table below:

Bit bit	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Function	run	Zero Speed	Treach	Sreach	Preach	Emg	ready	alarm
Bit bit	Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
Function	-	-	TCMDreach	SPL	TRQL	Pnear	HOME	BRK

If Bit is 0, it means the function is ON, and if it is 1, it means OFF.

No.6Chapter Alarm and Handling

6.1Alarm clear operation

For details, see "Auxiliary Mode Operation" in Chapter 3Alarm clear operation ".

6.2Alarm Contents and Countermeasures

alert display	clearing method	Abnormal alarm description	Method of exclusion
AL-01	Power on again	The memory contents are corrupted or the memory chip damage	1: Initialize the parameters and observe the situation. 2:passmodbusCommunication mode and key operation mode At the same time, the editing operation of the parameters may cause If the check code is wrong, an alarm will be triggered. 2: The internal chip is damaged, replace the servo amplifier.
AL-02	reset	In case of low low pressure alarm on , the DC bus voltage is lower than200V when the alert is issued.	1: Use a voltmeter to measure whether the external power supply voltage complies with the regulations grid specifications are met, Auxiliary mode availableFn009, Carry out bus voltage calibration. 2: Through the display panel, enter the monitoring mode and observe Whether the displayed voltage is consistent with the external voltage, if there is a difference If it is too large, the internal components will be damaged, so replace the servo amplifier. 3: The motor load is heavy, and the starting speed is too fast, causing the internal bus line voltage is pulled low. If it is a single-phase power supply, please Connected with three-phase power supply.
AL-03	Power on again	Internal DC bus voltage too high	1: Use a voltmeter to measure whether the external power supply voltage complies with the regulations grid specifications are met, Auxiliary mode availableFn009, Carry out bus voltage calibration. 2: Through the display panel, enter the monitoring mode and observe Whether the displayed voltage is consistent with the external voltage, if there is a difference If it is too large, the internal components will be damaged, so replace the servo amplifier. 3: Appropriately decelerate small load inertia within a reasonable range Or prolong the acceleration and deceleration time, otherwise it is necessary to add braking power resistance.
AL-04	Power on again	The report generated directly by the intelligent power module	1: Check the motor power lineU,V,WIs there a short circuit between phases or

		police	Short circuit to ground, and whether the encoder wire is connected normally. 2: The heat sink temperature is high, turn off the power,30seconds later Power on, if the alarm still occurs, maybe the internal power The module is damaged, replace the servo amplifier. 3:The speed loop and current loop proportional integral parameters are not set properly.
AL-05	reset	overload1	Pn014During the time set by the parameter, continuously greater than the overload Capability parametersPn012orPn013The electric power of the set multiple flow. 1: Check the motor wireU,V,Wand whether the encoder line is correct often. 2:Motor acceleration and deceleration frequency is too high, prolong the acceleration and deceleration time, Reduce the load inertia or change to a servo with a larger power capacity motor.
AL-06	Power on again	overload2	Pn015During the time set by the parameter, continuously greater than the rated load load3times. Troubleshoot method reference overload1. Note: Some motors can only bear the rated load2.5or2 times, do not press3times as calculated.
AL-07	reset	Motor speed is too high	1: Check the motor wireU,V,Wand whether the encoder line is correct often. 2: Reduce the pulse frequency of the input command, or adjust the electronic gear ratio. 3: Speed loop proportional integral parameters are not adjusted properly, re-adjust all.
AL-08	reset	The heat sink of the servo amplifier is overheated, The actual temperature has exceeded the set value of Pn084	1: Repeated overloading will cause the driver to overheat, please change the power machine operation mode. In order to prolong the service life of the server, the ambient temperature60Use below ℃, the recommended temperature should not exceed Pass50℃. 2: Brake average power overload.
AL-09	Power on again	Encoder exception	1: Check whether the motor encoder wiring is connected to the drive device. 2: Check whether the motor encoder interface is soldered, short-circuited or If it falls off, is the encoder power cable connected normally? 3: Check the encoder supply voltage (5V±5%). (ed.

			When the encoder cable is long, special attention should be paid)
AL-10	reset	The actual receiving pulse frequency is too high, exceeding PassPn234set value	1: Reduce the pulse frequency of the input command
AL-11	reset	Position pulse deviation is greater than the set value	1: Check whether the motor wires U, V, W and the encoder wire are normal. 2 The position command smoothing time constant is set too large. 3: Increase the gain of the position loop to speed up the response speed of the motor Spend. 4: Use the monitoring mode to check whether the output torque of the motor is Reach the limit. 5: The internal 32-bit pulse counter overflowed.
AL-12	reset	The current sampling circuit may be damaged.	1: The instantaneous current is too large, beyond the detectable range. 2: Check whether the motor wires (U, V, W) are loose or not Abnormal connection phenomena such as ground short circuit. 3: The sampling circuit is damaged, replace the servo amplifier.
AL-13	Power on again	CPUinternal failure	1: The external interference is too large, reduce the interference. 2: The CPU chip is damaged, replace the servo amplifier.
AL-14	reset	Emergency stop signal active	Check the port, whether the emergency stop function is set, the signal Whether the number contact is in the normally closed state (ON)
AL-15	reset	Driver disabled exception,CcwlorCwl forOFFstate	1:examineCCWL, CWLWiring, whether the signal contact is normally closed (ON). 2:If the drive prohibition function is not used, it can be setpn006 parameter, mask it.
AL-16	reset	Input power voltage is too high or the braking load rate reaches85%above	1:Use monitor mode to see if the input voltage exceeds the positive Normal range 2:Reduce start-stop frequency 3:Externally connect a higher power regenerative braking resistor (remove the internal braking resistor, cannot be connected in parallel) 4:increase deceleration time 5:Whether the power value and resistance value of the regenerative resistor are set correctly 6:Replacement of higher power motors and drives
AL-17	Power on again	Setting the encoder output frequency division ratio does not when.	Reset Pn016, Pn017 parameter value, must meet DA/DB>=1.
AL-18	Power on again	The current drive model does not support setting motor model	Refer to the driver and motor model adaptation table, reset Pn001.

AL-19	reset	Power module overheating	The temperature of the power module is too high, and the heat is serious, and it needs to be cooled for a period of time, otherwise the service life of the module will be reduced.
AL-20	Power on again	Assignment of the same function to several inputs mouth	View all SigIn ports and remove duplicated ports mouth.
AL-21	Power on again	Memory contents completely destroyed	1:Initialize the parameters and observe the situation. if more frequently An alarm has occurred, please replace the servo amplifier. 2:The internal chip is damaged, replace the servo amplifier.
AL-22	Power on again	Watchdog timer overflow	1:Power on again. If it occurs repeatedly, please replace the servo amplifier device. 2:External disturbance is too large, reduce external disturbance.
AL-23	Power on again	Abnormal current zero drift compensation	1:Power on again, if it occurs repeatedly, the current sampling loop Device may be damaged.
AL-24	Power on again	Programmable Logic Chip Abnormal	1:Power on again. If it occurs repeatedly, please replace the servo amplifier device. 2:External disturbance is too large, reduce external disturbance.
AL-25	Power on again	DSPchip abnormality	Power on again. If it occurs repeatedly, please replace the servo amplifier device.
AL-26	Power on again	Unsupported homing combination	Refer to Appendix F, reset Pn034, Pn035.
AL-27	Power on again	The resistance value of the external braking resistor is smaller than that of the pur- The device model allows the minimum resistance.	Re-purchase an external braking resistor.
AL-28	Power on again	The regenerative overload rate of the braking resistor exceeds Pn090set value, the resistor surface has been produce a higher temperature rise. Must be on standby resistance cooling15Power on after more than a minute, Otherwise, restart the electrician continuously for a short time operation, it may cause the resistance to burn out, Start a fire.	1 Enter Dn013 to check the braking electric regenerative load ratio.
AL-29	Power on again	Abnormal short-term continuous braking of the servo	1 Enter Dn04 to check whether the input power voltage is too high. 2 The wiring is disconnected or the braking resistor is not connected
AL-31	Power on again	Absolute encoder battery low voltage warning	The battery voltage is lower than 3.1±0.1V. Please replace the battery immediately pool, otherwise multi-turn data will be lost.

AL-32	Power on again	Absolute encoder battery voltage is too low	It has occurred that the battery voltage is lower than 2.5±0.2V. Check whether the battery is loose; whether the battery voltage is normal. please executeFn015operation, reset the multi-turn information to solve In addition to the alarm.
AL-33	Power on again	Absolute encoder multi-turn count overflow	When the servo is powered on or off, the multi-turn counter counts Count boundary exceeded. Please perform Fn015 operation to reset Multi-turn information. In practical applications, there is no need to perform multiple turns Overflow detection, Pn219 parameter can be set to close multi-turn overflow Call the police.
AL-34	Power on again	Absolute encoder counting error	During power-up, the motor speed is too high. Please power on again.
AL-35	Power on again	Absolute encoder power-on error	When the encoder is powered on, the motor is rotating and the speed is higher than 100r/min. When power on, the motor must be at rest or low speed state.
AL-36	Power on again	Absolute encoder multi-turn error	An error occurred in the multiturn count. please executeFn015operate, Reset multi-turn information.
AL-37	Power on again	motor overheating	1The internal temperature of the motor exceeds110℃, please cool down for a while between. 2The motor is over-used, please use a motor with a larger capacity
AL-38	Power on again	Absolute encoder detects overspeed alarm police	The battery is not connected or the battery voltage is too low; The actuator is not connected to the power supply, and the motor is over-accelerated due to external rotation. big. Please check the battery, and then executeFn015operation, repeat bit multiturn information.
AL-41	Power on again	Communication failure, absolute encoder no response	1: Check if the motor encoder connector is connected to the drive device. 2: Check whether the motor encoder interface is soldered, short-circuited or fall off; whether the wiring sequence of the encoder signal line is correct; Check whether the power cord of the encoder is properly connected. 3: The encoder is damaged.
AL-42	Power on again	During absolute encoder communication, continuous too many errors	1: Check whether the motor encoder connector is in poor contact, Whether the encoder cable is too long. 2: Check the wiring of the encoder cable, try to avoid Strong interference sources such as machine lines and power lines are entangled, and should be kept quite a distance. 3: Encoder interface circuit failure

			4: Excessive external disturbance, reduce external disturbance
AL-43	Power on again	Absolute encoder internal storage unit data error	The storage unit is not initialized or the data is corrupted, please execute Fn017operation, to reinitialize the data.
AL-44	Power on again	Absolute encoder frequency division circuit failure	The encoder is abnormal or the motor speed is too high
AL-45	Power on again	Reset Absolute Encoder Multiturn Error operation error	refer toAL-42Treatment measures
AL-46	Power on again	Reset absolute encoder single-turn error operation error	refer toAL-42Treatment measures

6.3Other failure phenomena and treatment measures

When the servo driver does not send out an alarm, the fault conditions and treatment measures are shown in the table below. If the abnormal situation still cannot be eliminated after treatment, please contact our technical personnel.

Symptoms	reason	Inspection method and treatment measures
Servo motor cannot start Moving	Control power is not connected	Check voltage across control power terminals
	The main circuit power is not connected	Check voltage across mains terminals
	The wiring of the control wire (CN2 connector) is incorrect or disconnected	Check the installation and wiring of CN2 connector
	Servo enable (SON) input is OFF	Check if the input pin is off or wrongly connected, check Dn014 Displayed port input status; You can also directly set the internal enable of the drive (Pn003=1)
	The input torque, speed or position command is too small or zero or not	Check if the input pin is off or wrongly connected; increase the input command; torque, speed or position command source selection parameters Settings are not as expected
	The driver does not respond to the pulse command sent by the host computer	Check whether the input pins are off, and whether the wiring sequence is wrong chaos; check Dn006, whether the receiving pulse frequency is consistent with the upper The frequency sent by the motor is the same; check whether the motor is working Position mode and enabled; check SigIn Whether the port is assigned Pclear and INH functions, and whether the state of the signal is valid
	Error specifying input port function number	Check whether the SigIn port function parameter setting is correct
	System load is too high	Carry out JOG test run without load to check whether the drive is normal run
	Offset pulse clear (Pclear) remains ON	Check the Pclear input signal, port and wiring, and check the port input status displayed by Dn014
	Forward drive prohibition (CCWL), reverse drive prohibition (CWL) input signal remains OFF	Check CCWL, CWL input signal, port and wiring, check the port input status displayed by Dn014
	Motor power line (UVW) wiring error	Check whether the power line wiring sequence is correct

	Servo drive failure	The internal circuit board of the driver is faulty and must be repaired
	Torque limit is valid	The internal or external torque limit value (Pn008~Pn011) is valid and the limit value is too small
	Command pulse frequency is too low	Command pulse input mode is incorrect, check Dn007 display The input pulse frequency; the ratio of the numerator and denominator of the electronic gear ratio (Pn098~Pn112) is too small; the command pulse input mode (Pn096) and the pulse sent by the host computer The punching method does not match, and the wiring sequence is wrong
	It is in zero-speed clamping state during speed control	SigIn:zero_LockThe signal isOnstate; at zero speed clamp level (Pn165)within the scope;
Instantaneous operation of the servo motor stand still	Motor wire wiring error	Check whether the wiring sequence of the motor power line is correct
	Encoder wiring error	Check whether the wiring sequence of the encoder is correct

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No.7chapterModbusserial communication

7.1 ModbusIntroduction to Communication

This driver has RS-232 and RS-485 communication interface, Users can choose an interface to communicate with the driver. The communication method adopts Modbus Transfer protocol, the following two communication modes can be used: ASCII (American Standard Code for information interchange) mode mode and RTU (Remote Terminal Unit) mode. Before communication, the parameters related to communication (Pn064~Pn071) must be set.

7.1.2encoding meaning

ASCII mode:

Each 8-bit data consists of two ASCII characters. For example: a 1-byte data 78H (hexadecimal notation), in ASCII code Indicates that it includes the ASCII code of '7' (37H) and the ASCII code of '8' (38H).

The ASCII codes of numbers 0 to 9 and letters A to F are 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 is composed of two 4-bit hexadecimal data, that is, the number composed of general hexadecimal. For example: decimal 120 is used 1-byte RTU data is expressed as 78 H.

7.1.3data structure

10bitcharacter mode (for7bitdata)

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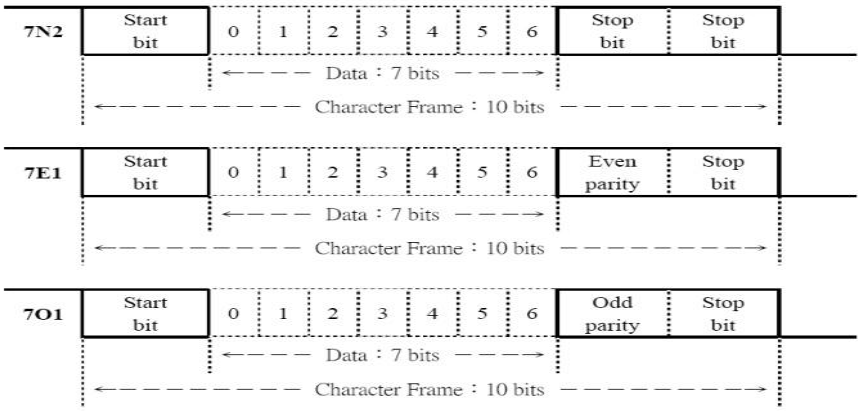

11bitcharacter mode (for8bitdata)

7.2Communication Protocol Structure

● ASCIImodel

name	meaning	illustrate
start	start of communication	Start character ':'(ASCII: 3AH)
address	contact address	Communication address, that is, the station number of the driver. example For example: the site number of a driver is32,sixteen base is20H, Address ='2' ,'0'

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		Right now' 2 '=32H , '0'=30H
cmd	Order	1 bytes contain 2 indivualASCIIcode. Commonly used make: 0 3 H(read register), 0 6 H((read single register), 0 8 H(diagnostic function), 1 0 H(Write multiple registers)
DATA(n-1)	data content	Nwords= 2 Nbytes = 4 NindivualASCIIcode (N<=8)
……		
DATA(0)		
LRC	check code	1 bytes contain 2 indivualASCIIcode
End 1	end code 1	0 DH ,Right nowCR
End 0	end code 0	0 AH ,Right nowLF

● RTUmodel

name	meaning	illustrate
start	start of communication	At least 3 .5quiescent time of byte transmission time part
address	contact address	Communication address, that is, the station number of the driver. example For example: the site number of a driver is 3 2 ,sixteen base is 2 0 H, Address =20H
cmd	Order	1 byte. Common commands: 0 3 H(read register), 0 6 H((read a single register), 0 8 H(diagnosis Function), 1 0 H(write multiple registers)
DATA(n-1)	data content	Nwords= 2 Nbytes (N<=8)
……		
DATA(0)		
CRC	check code	1 byte
End 1	Finish	At least 3 .5quiescent time of byte transmission time part

7.3Commonly used command codes

7.3.1read multiple registers

03H: Read multiple registers

Description: readNwords,Nfor 1~8range of values

Example: The slave station number is 01 HRead start address on the drive 0013 Hthe beginning 2 words.

1. ASCIImodel

PC->driver

start		':'
address		'0'
		'1'
cmd		'0'
		'3'
data start address	high position	'0'
		'0'
	low	'1'
		'3'
Number of read registers		'0'
		'0'
		'0'
		'2'
LRC		'E'
		'7'
END1(CR)		0DH
END0(LF)		0AH

Response -> PC (OK)

start		':'
address		'0'
		'1'
cmd		'0'
		'3'
data bytes		'0'
		'4'
address 0013H content	high bit	'0'
		'0'
	Low bit	'3'
		'2'
address 0014H content	high bit	'0'
		'0'
	Low bit	'0'
		'A'
LRC		'B'
		'C'
END1(CR)		0DH
END0(LF)		0AH

Response -> PC (Error)

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

2 .RTUmodel

PC->driver

address		01 H
cmd		03 H
data start address	high bit	00 H
	Low bit	13 H
Number of read registers		00 H
		02 H
CRClow		35 H
CRChigh position		CEH

Response -> PC (OK)

address		01 H
cmd		03 H
data bytes		04 H
0013 Hland within the address Allow	high bit	00 H
	Low bit	32 H
0014 Hland within the address Allow	high bit	00 H
	Low bit	0AH
CRClow		DBH
CRChigh position		FBH

Response -> PC (Error)

address	01 H
cmd	83 H
exception code	02 H
CRClow	C0H
CRChigh position	F1H

7 .3.2write a single register

06 H: Write a single register

Description: Write a word to a register.

For example: drive station number is 01 , the initial address of writing data is 0013 H,data input 100 (64H).

1 . ASCIImodel

PC->driver

start	':'
address	'0'
	'1'
cmd	'0'
	'6'

Response -> PC (OK)

start	':'
address	'0'
	'1'
cmd	'0'
	'6'

Response -> PC (Error)

start	':'
address	'0'
	'1'
cmd	'8'
	'6'

data start address	high position	'0'
		'0'
	low	'1'
		'3'
data content (word format)		'0'
		'0'
		'6'
		'4'
LRC		'8'
		'2'
END1(CR)		0DH
END0(LF)		0AH

data start address	high position	'0'
		'0'
	low	'1'
		'3'
data content (word format)		'0'
		'0'
		'6'
		'4'
LRC		'8'
		'2'
END1(CR)		0DH
END0(LF)		0AH

exception code	'0'
	'3'
LRC	'7'
	'6'
END1(CR)	0DH
END0(LF)	0AH

7

2.RTUmodel

Host computer -> drive

Actuator

address		01H
cmd		06H
data start address	high position	00H
	low	13H
data content (wordFormat)		00H
		64H
CRClow		79H
CRChigh position		E4H

Response -> PC (OK)

address		01H
cmd		06H
data start address	high position	00H
	low	13H
data content (wordgrid Mode)	F4H	00H
	48H	64H
CRClow		79H
CRChigh position		E4H

Response -> PC (Error)

address	01H
cmd	86H
exception code	03H
CRClow	02H
CRChigh position	61H

7.3.3diagnosis

08H:diagnostic function

Description: use sub-function code 0000H, check inMasterandSlavertransmission signals between them. The data content can be any number.

For example: for a site of 01 HThe drive uses the diagnostic function.

1 . ASCIImodel

PC->driver

start		':'
address		'0'
		'1'
cmd		'0'
		'8'
Zigong energy code	high position	' 0 '
		'0'
	low	' 0 '
		' 0 '
data content (word format)		' 8 '
		'6'
		'3'
		' 1 '
LRC		'4'
		'0'
END1(CR)		0 DH
END0(LF)		0 AH

Response -> PC (OK)

start		':'
address		'0'
		'1'
cmd		'0'
		'8'
Subfunction code	high bit	' 0 '
		' 0 '
	Low bit	' 0 '
		' 0 '
data Allow (word Format)	high bit	' 8 '
		'6'
	Low bit	'3'
		' 1 '
LRC		'4'
		'0'
END1(CR)		0 DH
END0(LF)		0 AH

Response -> PC (Error)

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

2 .RTUmodel

PC->driver

address		0 1 H
cmd		0 8 H
Subfunction code	high bit	0 0 H
	Low bit	0 0 H

Response -> PC (OK)

address		0 1 H
cmd		0 8 H
sub function code	high bit	0 0 H
	Low bit	0 0 H

Response -> PC (Error)

address	0 1 H
cmd	8 8 H
exception code	0 3 H
CRClow	0 6 H

data Allow(word Format)	high bit	86H
	Low bit	31H
CRClow		43H
CRChigh position		BFH

data content (wordgrid Mode)	high bit	86H
	Low bit	31H
CRClow		43H
CRChigh position		BFH

CRChigh position	01H

7.3.4write multiple registers

10H:write multiple registers

Description: willNwords are written to consecutive registers,Nup to 8 (08H).

For example: put 100 (0064H), 300 (012CH)Write to the station number as 01 The starting address of the servo drive 0013 Hin two consecutive registers.

1. ASCIImodel

PC -> Driver

start		':'
address		'0'
		'1'
cmd		'1'
		'0'
data from origin address	high bit	'0'
		'0'
	Low	'1'

Response -> PC (OK)

start		':'
address		'0'
		'1'
cmd		'1'
		'0'
data start address	high position	'0'
		'0'
	low	'1'

Response -> PC (Error)

start	':'
address	'0'
	'1'
cmd	'9'
	'0'
exception code	'0'
	'3'
LRC	'6'

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	bit	' 3 '
Number of write registers		' 0 '
		' 0 '
		' 0 '
		' 2 '
data bytes		' 0 '
		'4'
write data to 0013H	high bit	' 0 '
		' 0 '
	Low bit	'6'
		'4'
write data to 0014H	high bit	' 0 '
		' 1 '
	Low bit	' 2'
		'C'
LRC		'4'
		'5'
END1(CR)		0DH
END0(LF)		0AH

		' 3 '
write post memory Number	high position	' 0 '
		'0'
	low	'0'
		' 2 '
LRC		'4'
		'1'
END1(CR)		0DH
END0(LF)		0AH

	'C'
END1(CR)	0DH
END0(LF)	0AH

2.RTUmodel

PC->driver

address		01H
cmd		10H
data from origin address	high bit	00H
	Low bit	13H
write deposit Number of devices	high bit	00H
	Low bit	02H
data bytes		04H
write data arrive 0013H	high bit	00H
	Low bit	64H
write data arrive 0014H	high bit	01H
	Low bit	2CH
CRClow		F3H
CRChigh position		24H

Response -> PC (OK)

address		01H
cmd		10H
data start address	high position	00H
	low	13H
write post memory Number	high position	00H
	low	02H
CRClow		B0H
CRChigh position		0DH

Response -> PC (Error)

address	01H
cmd	90H
exception code	03H
CRClow	0CH
CRChigh position	01H

Note1: The registers are always16bit signed integer.

Note2: readDn-13When parameterizing, the actual voltage value = read value/100.

7.3.5Check code calculation

1. LRCcheck

ASCIImode adoptedLRC(Longitudinal Redundancy Check) check code.LRCCalibration is calculationaddress,cmd, starting data

The sum of the address and data content, the sum result is256as the unit, take the remainder (if the sum result is150H, then only take50H), and then calculate

Its complement code, the final result isLRCchecksum.

Example: from site01HServo drive's0013address read2words (word).

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

fromaddressThe data of is added to the last data:

01H+03H+00H+13H+00H+02H=19H,because19HThe complement ofE7H,soLRCfor'E','7'

2. CRCcheck

RTUmode adoptedCRC(Cyclical Redundancy Check) check code. Cyclic Redundancy Check (CRC)The field is two bytes and contains a

binary16bit value. appended to the messageCRCThe value of is calculated by the sending device. The receiving device recalculates when receiving the messageCRC

value and compare the calculated result with the actual receivedCRCvalue compared. It is an error if the two values are not equal.

CRCcalculations, starting with a16Bit registers preloaded with full1.Then the consecutive8Subsequent calculations are performed on it.

only characters in8data bits involved in generatingCRCoperation, the start bit, stop bit and parity bit are not involvedCRCcalculate.

generateCRCThe process is:

1.put one16bit register loaded with hexFFFF (Complete1).call itCRCregister.

2.the first8bit byte with16bitCRCThe low byte of the register is XORed, and the result is placed inCRCregister.

3.WillCRCregister shift right1bit (toLSBdirection),MSBFill zero. Extract and detectLSB.

4. (ifLSBfor0):repeat steps3 (another shift).

(ifLSBfor1):rightCRCregister xor polynomial value0xA001 (1010 0000 0000 0001).

5.repeat steps3and4until the completion8time shift. When this is done, it will complete the8Complete operations on bitbytes.

6.Repeat steps for next byte in message2arrive5, continue this operation until all packets are processed.

7. CRCThe final content in the register isCRCvalue.

8.when placedCRCWhen the value is in the message, the high and low bytes must be exchanged. The low order byte is sent first, followed by the high order byte

Example: Slave site number is01Hdrive reads2words (word), the read start address is0200Haddress. fromaddressto

The last digit of the data is calculated byCRCThe final contents of the register are0704H, the instruction format is as follows, note that04Hexist07H

forward transmission.

address		01H
cmd		03H
Data start address	high position	02H
	low	00H
Data length (inwordcalculate)		00H
		02H
CRClow		C5H
CRChigh position		B3H

CRCGenerate example:

Below toClanguage productionCRCvalue. This function takes two parameters:

unsigned char * data;//Data start address, used to calculateCRCvalue

unsigned char length; //Data length

This function will returnunsigned integerType ofCRCvalue.

```
unsigned int crc_chk(unsigned char * data, unsigned char length)
{
   int i,j;
   unsigned int crc_reg=oxFFFF;
    While(length- -)
    {
      Crc_ reg ^=*data++;
```

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```
    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;
}
```


7.3.6exception code

During the communication process, communication errors may occur, and the common error events are as follows:

communication error event	Countermeasures for Servo Drives
When reading and writing parameters, the data address is incorrect;	The request is not processed and an error exception code is returned
When writing parameters, the number of written data exceeds the maximum value or the data is not in this parameter within the value range of the number;	The request is not processed and an error exception code is returned
Data transmission error or check code (LRC,CRC, parity) error	The data is discarded and no response is returned, and the upper computer should treat the request as a super time state processing

When the driver sends an error exception code, add the command function code to80Hsend together laterModBusmaster system. If in broadcast mode, No exception code or data is returned. The exception codes are as follows:

01H	The servo drive cannot recognize the requested function code
02H	The data address given in the request is illegal
03H	The data given by the request is not allowed in the servo drive (reading and writing data The number exceeds the maximum value allowed by the drive or the value of the write data is not in the parameter value range)
04H	The servo drive has started to execute the request, but cannot complete the request

	beg.

7.4Servo parameter, status information communication address

data address		meaning	illustrate	Operating authority
hexadecimal	decimal			
0000H~00ECH	0 ~ 236	Parameter setting area	correspondPn000~Pn236	readable and writable
0164H~016DH	356 ~ 365	Alarm record area	existFn000can be viewed in correspondSn--0~Sn--9	read only
0170H~018CH	368 ~ 396	data monitoring area	correspondDn000~Dn028	read only

No.8Chapter Operation and Adjustment

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

◢ Is the power terminal wiring correct and reliable? Is the input voltage correct?

◢ Is there a short circuit or grounding in the power line and motor line?

◢ Is the encoder cable connected correctly?

◢ Are the drive unit and motor fixed firmly?

◢ Is the motor shaft not connected to the load?

◢ Is the connection of braking resistor (optional) correct?

◢ Is the serial communication cable (optional) connected correctly?

8.1jog run

(1) Servo enable (SON) OFF. Internal enable (Pn003=0) or external wiring control enable is OFF. It is recommended that the CN2 control interface is not connected to any control lines.

(2) Turn on the power supply of the circuit, and the 5-digit digital tube display of the driver will light up. If there is an alarm, the 5 decimal points will keep flashing, and the alarm code AL-xx will be displayed. Please check the connection.

(3) After confirming that there is no alarm or any abnormal situation, enter the auxiliary mode Fn002 subdirectory JOG_0 (see Chapter 3 for specific operations and parameter settings Section 3.4.4 Fn002 trial run operation), press and hold▲key or▼Press the key to run forward and reverse, release the key, after the motor decelerates, it will no longer be energized.

8.2Press the button to adjust the speed

(1) Servo enable (SON) OFF. Internal enable (Pn003=0) or external wiring control enable is OFF. It is recommended that the CN2 control interface is not connected to any control lines.

(2) Turn on the power supply of the circuit, the 5-digit digital tube display of the driver will light up, if there is an alarm, the decimal point will keep flashing, and the alarm code AL-xx will be displayed. Please check the connection.

(3) After confirming that there is no alarm or any abnormal situation, enter the auxiliary mode Fn002 subdirectory JOG_1 (for specific operations and parameter settings, refer to Fn002 trial operation in Chapter 3, Section 3.4.4). After entering the lower directory of JOG_1, the display shows 0 (unit: r/min) and the motor is powered on.

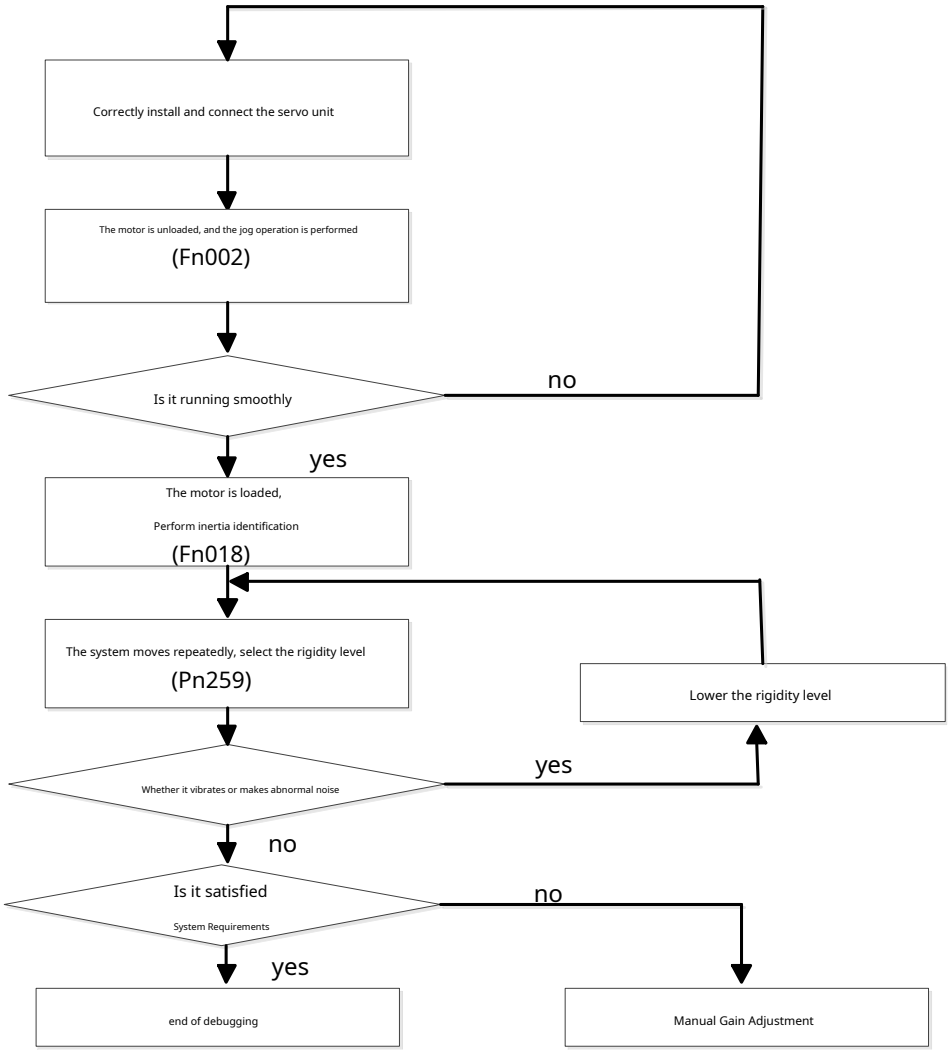
over press▲key or▼key, input the speed that the motor will run, and the motor will run at this speed. To quit this operation, JOG_2 operation is required.

8.3gain tuning

Gain tuning is a function to optimize the servo response performance by adjusting the servo gain parameter combination (moment of inertia ratio, position loop gain, speed loop proportional gain, speed loop integral time, command filter, etc.). When adjusting the servo gain, the interaction between each parameter must be considered, so it is necessary to adjust the value of each gain parameter in a balanced manner, and extreme settings are not allowed.

In general, high-rigidity machines can improve responsiveness by increasing the servo gain. For low-rigidity machinery, increasing the servo gain may cause vibration and bring negative effects. At this time, the vibration can be suppressed by lowering the rigidity level or various vibration suppression functions of the servo unit.

The general system debugging process is shown in the figure below:



8.3.1System inertia identification

Auto-tuning means that the servo recognizes the moment of inertia of the load during operation to achieve the level of mechanical rigidity (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:

- Rapid change of load inertia
- Very low mechanical rigidity
- Insecure connection of mechanical parts, e.g. backlash
- Maximum speed less than 150 rpm and continuous low speed use
- Acceleration and deceleration within 1 second in a gentle state of 2000 rpm or less
- Load rigidity prone to small vibrations or high friction

Relevant parameters for inertia estimation:

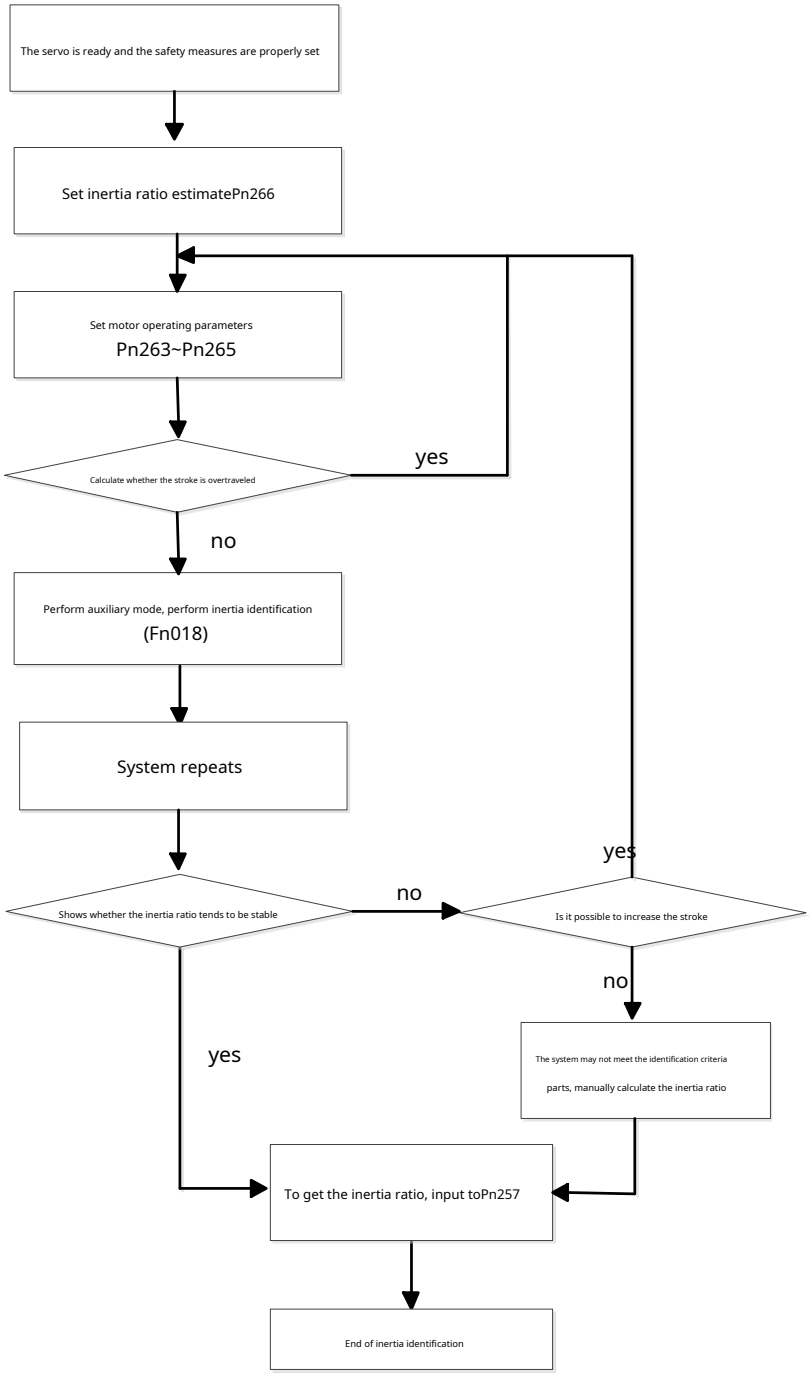
Pn257	Load moment of inertia ratio	0~100.00	1.00	times
Pn263◆	Inertia estimation acceleration and deceleration time	20~500	80	ms
Pn264◆	Inertia estimation allowable maximum speed	150~1000	400	r/min
Pn265◆	Inertia estimation pause time interval	0~10000	500	ms
Pn266◆	Inertia estimated inertia ratio estimated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

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

Before starting the offline inertia estimation operation, the following settings must be made:

- The main power is connected.
- The servo is not enabled.
- Install limit switches, use positive drive prohibition (CCWL), reverse drive prohibited (CWL)Function to prevent accidents caused by mechanical overtravel.
- All parameters are set properly, the acceleration and deceleration time and running speed of the motor estimated by the inertia are proper, and the gentle and low-speed running state should be avoided as far as possible.

The general flow of inertia identification is as follows:



Inertia identification flow chart

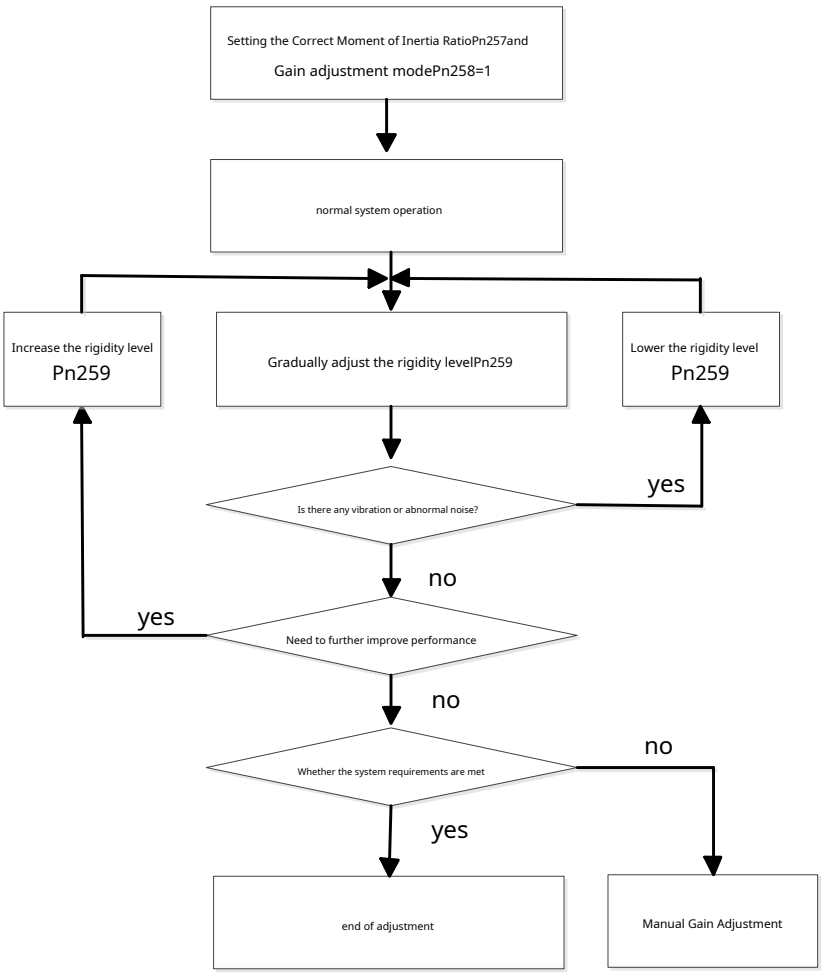
8.3.2Automatic Gain Adjustment

During automatic gain adjustment, mechanical rigidity settings include the followingtwenty onetypes. In setting gain adjustment mode (Pn258) for1, select the mechanical rigidity level (Pn259), the servo will automatically select servo gains (position loop gain, speed loop gain, speed loop integral time constant, torque command filter filter time) according to the gain parameter setting table. at this time,Pn115, Pn116,Pn153~P156, Pn196,Pn197The equal gain parameter is invalid in automatic gain adjustment mode. The gain parameter setting table is as follows:

Mechanical Rigidity Grade Pn259	Position loop gain [1/s]	speed loop gain [Hz]	Speed loop integration time Constant [0.1ms]	Torque filter 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	twenty two
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	twenty two	10
19	380	450	19	10
20	450	500	17	10

When adjusting the gain, if the setting value of the mechanical rigidity is increased, the response of the servo will be improved and the positioning time will be shortened. However, too high a gain can cause mechanical vibration. Therefore, please adjust from the low rigidity level step by step without vibration, and at the same time, the gain must have a margin to avoid a critical state. For load equipment with low connection rigidity such as pulleys, the set rigidity level should not be too high, and for load equipment with high connection rigidity such as ball screws, a higher rigidity level can be set.

The general flowchart of gain adjustment is as follows:



8.3.3Manual Gain Adjustment

When performing manual gain adjustment, setPn258for0. Adjust the response characteristics of the servo unit through the following servo gain parameters.

serial number	name	Ranges	Defaults	unit	Be applicable
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 integral time constant 1	1~ 5000	150	0.1ms	all
Pn155	Speed Regulator Proportional Gain 2	1~ 2000	80	Hz	all

Pn156	Speed regulator integral time constant 2	1~ 5000	150	0.1ms	all
Pn196▲	Torque command filter time constant 1	1~5000	40	0.01ms	all
Pn197▲	Torque command filter time constant 2	1~5000	40	0.01ms	all

The general process of manual gain adjustment is as follows:

step	content
1	Correctly set the moment of inertia ratioPn257. set upPn258for0.
2	In the case that the machine does not vibrate, increase the speed loop gain as much as possible (Pn153, Pn155), reduce the speed loop integration time constant(Pn154, Pn156).
3	Adjust the torque command filter time parameter (Pn196, Pn197),And place it at a setting that does not generate vibration.
4	repeat2and3Step, in the case of meeting the system requirements, properly reduce the speed loop gain and increase the integral of the speed loop constant, leaving a margin.
5	During position control, gradually increase the position loop gain (Pn115, Pn116).

Note 1: By default, Pn045=0, the first group of gains is valid, and it is not necessary to set the two groups of gains at the same time.

Note 2: You can properly refer to the gain parameter setting table, and fine-tune the parameters on this basis.

8.3.4Jitter suppression method

When the servo gain is too high, the motor shaft may vibrate. In order to avoid jitter, it can be handled as follows:

● In position control, after the positioning is completed, reduce the servo gain appropriately, and use the vibration suppression attenuation function parameters (Pn139~Pn141).

● Set the correct load inertia ratio. For large inertial loads or high rigidity and fast response equipment, too small speed loop time integral constant is likely to cause definite Bit overshoot or swing.

● Use the gain switching function (Appendix A) to reduce the gain of the jitter frequency band.

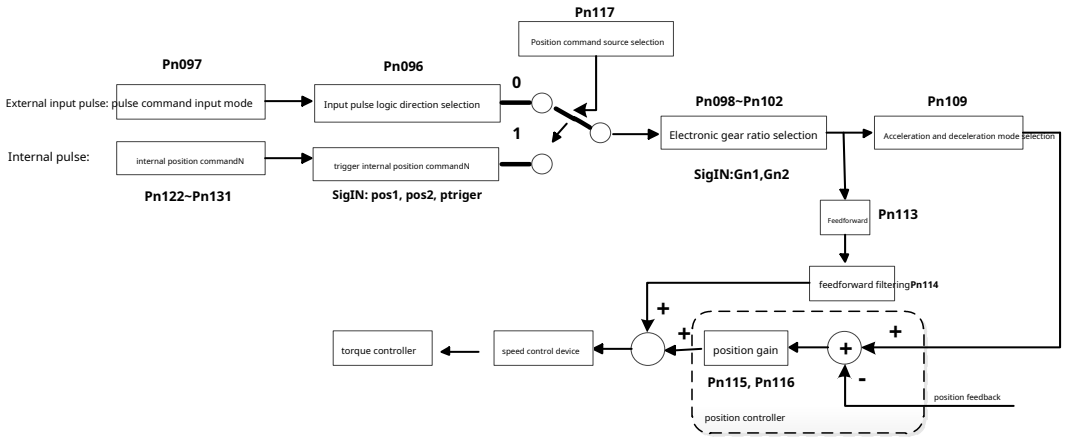
● Appropriately increase the torque command filter time parameters (Pn196, Pn197).

● Adjust the speed feedback compensation (Pn183). The larger the speed feedback compensation, the faster the response, but the louder the motor noise.

No.9Chapter SERVOPACK CONTROL STRUCTURE AND EXAMPLES

9.1Example of position control

9.1.1Position Control Structure Diagram



9.1.2Example of position control

External input in the form of pulse direction20KThe positive direction pulse of the frequency, the number of sending1.5Ten thousand, electronic gear ratio3:1, acceleration and deceleration time60ms. The parameters that need to be set:

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

If you do not use the external port to enable the motor, you can setPn003=1, the motor is automatically enabled internally. When the external input pulse, the motor rotates counterclockwise4.5lock up(2500line encoder).

9.2Example of speed control

9.2.1Speed Control Structure Diagram

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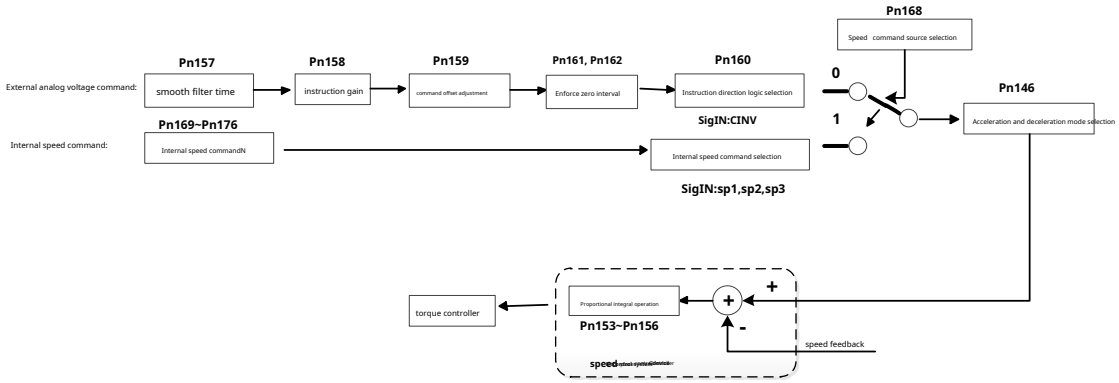


9.2.2Example of speed control

Using internal speed control, the drive is internally enabled, the motor rotates clockwise, and the speed is600rpm,usethe scurve acceleration and deceleration,Ts=10ms, Ta=30ms, Td=100ms.

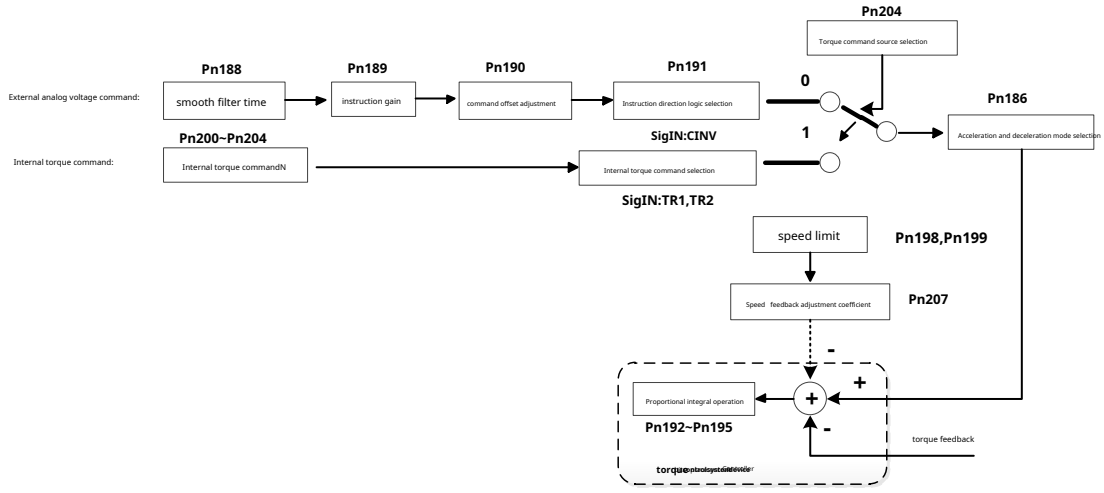
Parameters to be set:

Pn002=1, Pn003=1,Pn146=1,Pn147=10,Pn148=30,Pn149=100,Pn168=1,Pn169= -600.

9

9.3Example of torque control

9.3.1Torque Control Structure Diagram



9.3.2Example of torque control

External analog voltage output0.5V,torque up to rated torque15%, the maximum speed limit of the motor under light load is1800rpm,

Acceleration and deceleration time is500ms,Internal auto-enable operation.

Set the parameters as follows:

Pn002=0, Pn003=1, Pn186=1, Pn187=500, Pn198=1800,Pn204=0.

Note: In the case of no-load or light-load, the actual torque cannot reach the input torque command, and the motor runs at the maximum speed limit.

9.4Electronic gear ratio calculation

The electronic gear function is a function to scale the movement amount of the workpiece by one input pulse command. 1 input pulse command is also called "1 command single "bit". Through the electronic gear ratio adjustment, the "command controller" can be controlled regardless of the reduction ratio of the machine or the line number of the encoder.

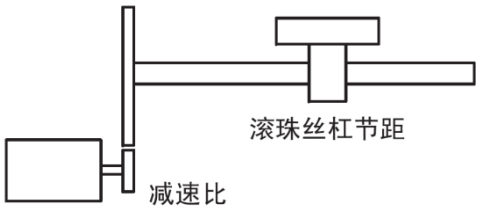
1Determine machine specifications

The elements related to electronic gear are as follows:

· Reduction ratio

· Ball screw pitch

· Pulley diameter etc.



9

2Servo motor encoder pulse number

encoder type	Number of pulses per revolution
incremental encoder	10000
17bit absolute encoder	131072

3decision unit

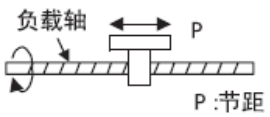
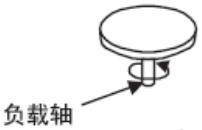
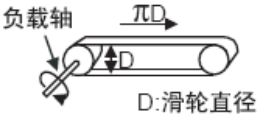
The command unit refers to the smallest unit of load movement position information. The command unit should be determined by considering factors such as machine specifications and positioning accuracy. often

The physical unit used can be used as the minimum instruction unit, such as 0.01mm, 0.001mm, 0.1°, etc.

4Calculate the load shaft rotation from the command unit1The amount of load movement of the circle.

Command unit for the load movement amount of the load shaft rotation circle $\frac{\text{load shaft rotation circle load movement}}{\text{command unit}}$

Example: When the ball screw pitch is 6mm and the command unit is 0.001mm, —— command unit.

滚珠丝杠	圆台	皮带 + 皮带轮
 1圈 = $\frac{P}{\text{指令单位}}$	 1圈 = $\frac{360^{\circ}}{\text{指令单位}}$	 1圈 = $\frac{\pi D}{\text{指令单位}}$

5Find the electronic gear ratio.

Assume that the reduction ratio of the motor shaft and the load shaft is set to (—), that is, the servo motor rotatesmcircle, load shaft rotationno.

Electronic gear ratio $\frac{\text{Encoder single-turn pulse number}}{\text{Command unit for the load movement amount of the load shaft rotation circle}} \times$ —

6Setting parameters

After the electronic gear ratio is reduced, it is set as a user parameter.

Electronic gear ratio (after approx. minutes) = ——

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9.5Electronic gear ratio example

9.5.1Ball screw rod

incremental encoder

10000pulses/turn

The command unit of the load movement amount of the load shaft rotation circle = 6mm/0.001mm = 6000

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

Set Pn098=5, Pn102=3.

9.5.2Round table

incremental encoder

10000pulses/turn

The command unit of the load movement amount of the load shaft rotation circle = 360°/0.01°=36000.

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

Set Pn098=250, Pn102=6.

9.5.3belt + pulley

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incremental encoder

10000pulses/turn

The command unit of the load movement amount of the load shaft rotation circle=3.14*100/0.005=62800.

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

Set Pn098=1250, Pn102=157.

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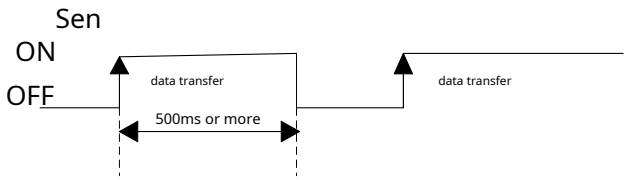
No.10Chapter Application of Absolute Servo Unit

10.1Absolute data information output mode

When the servo is not enabled, the host computer can request to read the single-turn and multi-turn data information of the encoder through the port signal SigIn:Sen signal. read

The timing is as follows:



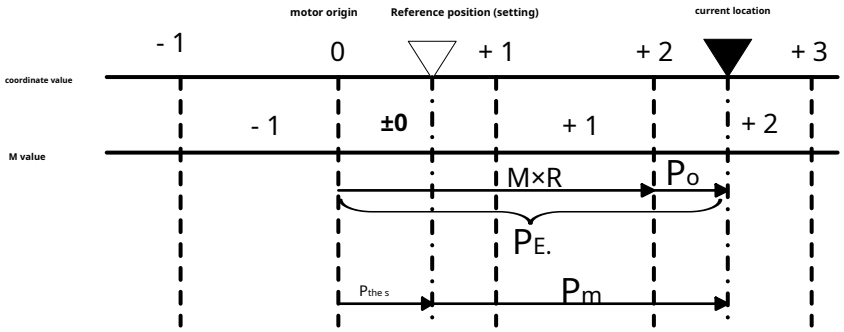
● Do not rotate the motor when reading single-turn and multi-turn data.

● If there is no fault in the encoder communication, it will output normal data, otherwise it will not respond.

● During the servo sending encoder data information, if the Sen signal changes from OFF to ON again, there will be no response until the data sending is completed.

● When the servo sends encoder data information, If the servo enable signal son or the internal enable is valid, it will not respond.

until the data transmission is complete.



Absolute position setting and calculation diagram

The final absolute value data PM is obtained according to the following formula:

$$PE = M \times R + PO$$

$$PM = PE - Ps$$

in:

PE: current value read from encoder

M : Multi-turn rotation data

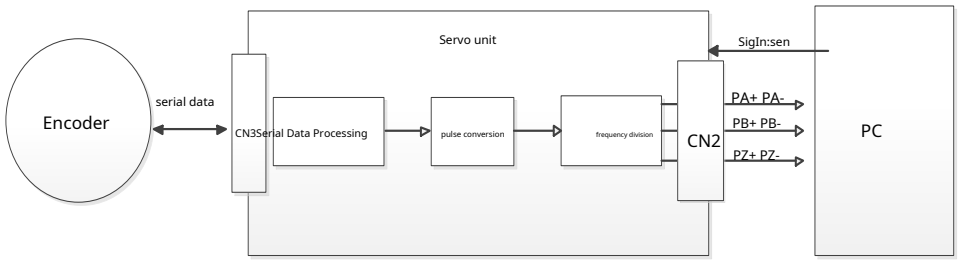
R : The number of pulses for one revolution of the encoder (the value after frequency division)

PO: number of initial incremental pulses (absolute position within a single turn)

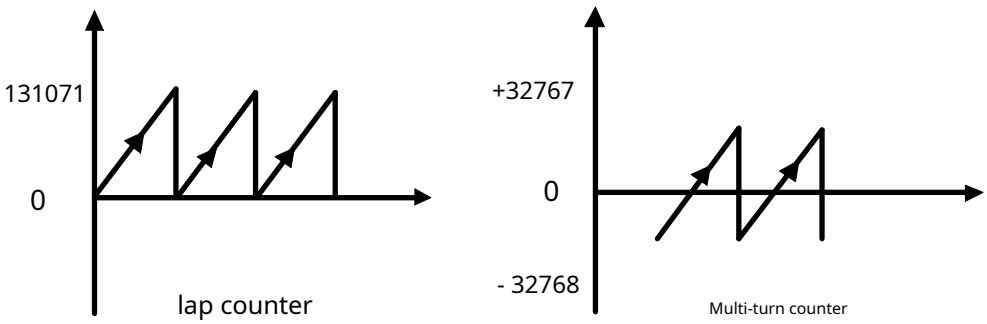
PS: The offset value of the reference position relative to the motor origin, the initial incremental value is saved and managed by the host computer PM:

The current position value required by the user relative to the reference position

10.2Absolute data information sending and receiving timing



Frame diagram of absolute servo unit data information sending and receiving



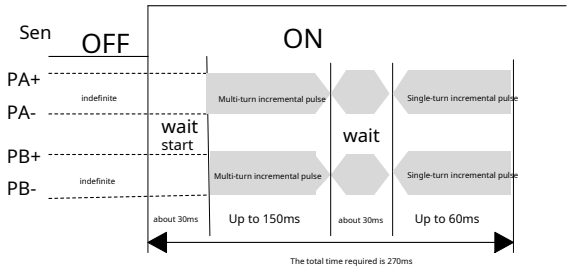
servo motor	lap data output range	Multiturn data output range	Operation when timeout
Equipped with 17 absolute pair encoder	0~131071	- 32768 ~+32767	When the multi-turn data is higher than the upper limit of forward rotation direction (+32767): multi-turn data = -32768 When the multi-turn data is lower than the lower limit of the reverse direction (-32768); multi-turn data = +32767

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

signal name	state	signal content
PA+ PA-	send and receive state	initial incremental pulse
	normal state	incremental pulse
PB+ PB-	send and receive state	initial incremental pulse
	normal state	incremental pulse
PZ+ PZ-	send and receive state	low level
	normal state	origin pulse

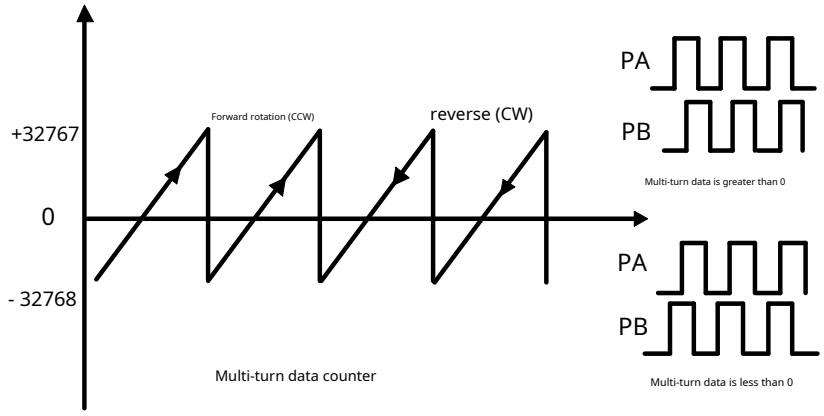
The single-turn incremental pulse is equivalent to the time when the motor shaft origin rotates from the motor shaft origin to the current motor shaft position at a speed of 1500r/min.

The output pulse of frequency division pulse speed. Like the usual incremental pulse, the single-turn position pulse is frequency-divided by the frequency divider inside the servo unit output later. The number of multi-turn incremental pulses represents multi-turn position data, which is not output through the frequency divider. Example: during a multi-turn incremental pulse , the number of received pulses + 300 means that the position of the motor shaft is at the 300th circle.



Initial Incremental Pulse Transmission Timing

Since the range of the multi-turn data is -32768~32767, when the multi-turn data is positive, the motor rotates counterclockwise (ccw); when it is negative, the motor rotates clockwise. The hour hand (cw) rotates. by default, When the multi-turn data is positive, When PA leads PB, on the contrary, PA lags behind PB. The range of single-turn data is 0~131071, PA leads PB.

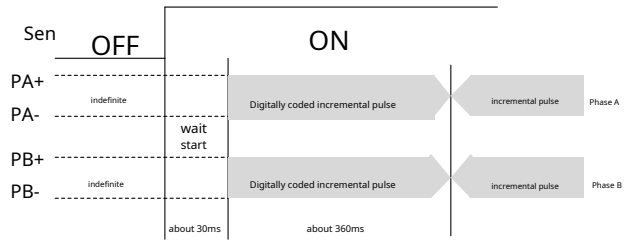


Note: If Pn018 encoder AB phase logic inversion parameter is set to 1, then PA, PB phase inversion, multi-turn data symbols will be inversion.

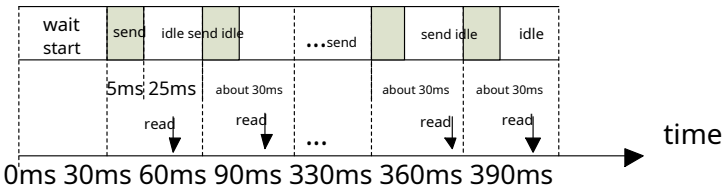
When Pn218=1, the single-turn and multi-turn absolute position data information is sent in the form of pulse digital code. Multiple readings are recommended to obtain correct the absolute position of .

signal name	state	signal content
PA+ PA-	send and receive state	Digitally coded incremental pulse
	normal state	incremental pulse
PB+ PB-	send and receive state	Digitally coded incremental pulse
	normal state	incremental pulse
PZ+ PZ-	send and receive state	low level
	normal state	origin pulse

Digitally coded incremental pulse: every 30ms, the servo will send several pulses, and the number of pulses will be regarded as a hexadecimal number (0~15->0~F).



Digitally coded incremental pulse transmission timing



Digitally encoded incremental pulse frame format

N1~N4	N5~N8	N9~N12
16-bit multi-turn data (signed integer)	16-bit single-turn data (unsigned integer)	16-bit CRC check code (unsigned integer)

When sending pulses, the pulse increment of each sending is within 0~15, and the sending is completed within 5ms. The timing starts when the Sen signal of the host computer changes from off to on. Considering the fixed response delay of a few milliseconds, the host computer must select an appropriate time point and read the number of pulse changes (hexadecimal). For example, at 30ms, the servo sends 3 pulses, and the host computer can read the pulse increment at 50ms, and the number of 3 represents the number 3. After reading, wait tens of milliseconds, read the second pulse increment at 80ms, and so on.

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example:

order	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12
Number of pulses	0	3	14	8	1	0	10	5	4	13	14	15
	High bit 0x03		Low bit 0xe8		High bit 0x10		Low bit 0xA5		CRC low bit 0x4D		CRC high bit 0xEF	
result	Multi-turn data: 03e8H=+1000				Single lap data: 10A5H=4261				CRC:EF4DH			

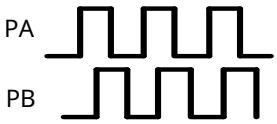
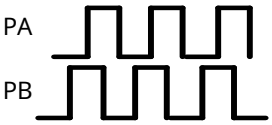
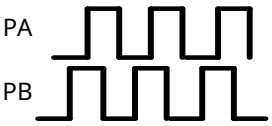
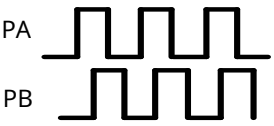
Data frame (8bits)	03H	E8H	10H	A5H	4DH	EFH

Among them: the CRC polynomial adopts the polynomial in the modbus protocol:0xA001, its algorithm and code are in Chapter 7modbusListed in detail in the communication function.

In addition, the host computer can also use the modbus serial communication method to read the absolute position information (Dn025~Dn028).

10.3ABZPulse signal frequency division output

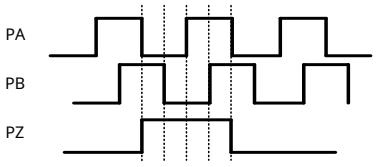
● By setting Pn018 parameter, the phase relation of AB pulse signal can be changed.

Pn018	Forward(ccw)	reverse (cw)
0		
1		

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

● Phase relationship of the Z pulse

The Z signal is edge-aligned with the A or B signal for 4 pulse times.



10.4Initialization of the absolute encoder

Must pass whenFn015The operation initializes the absolute encoder:

● Initial start-up of machinery

● An encoder battery low voltage alarm occurs

● Encoder internal fault alarm occurs

● To set the multi-turn data of the absolute encoder to 0

When an absolute encoder alarm occurs, and the multi-turn data information does not need to be reset, the Fn016 operation can be executed to clear the alarm on the encoder.

10.5Installation of Absolute Encoder Battery

When Pn216 is set to 1, the absolute encoder is used for multi-turn, in order to save the position data of the absolute encoder, a battery unit needs to be installed. Please install the battery unit on either side of the upper device or the servo unit. Do not install battery units on both sides of the upper device and the servo unit. If it is installed on both sides at the same time, a loop will be formed between the batteries, which is very dangerous. The battery must be between 3.2V~4.5V, too high voltage will damage the encoder, and too low voltage will generate a low voltage alarm. In general, please use a 3.6V 2000amH lithium battery.

Just plug in the power before changing the battery. Do not enable the drive to keep the motor in working condition. If the battery is removed after the control power supply of the servo unit is OFF (including when the encoder cable is removed), the set absolute encoder data will be lost. At this time, it is necessary to execute the Fn015 operation to reset the multi-turn data information.

When replacing the battery, please pay attention to the polarity of the battery and the serial number of the driver. If the polarity is reversed, the encoder will be damaged. After replacing the battery, if the driver generates an encoder alarm, please execute Fn016 operation to reset the encoder alarm information, and then power on the driver again.

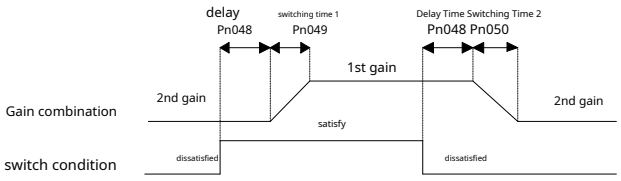
appendix

appendixAgain switching

first gain		second gain	
parameter	name	parameter	name
Pn153	Speed Regulator Proportional Gain1	Pn155	Speed Regulator Proportional Gain2
Pn154	Speed regulator integral time constant1	Pn156	Speed regulator integral time constant2
Pn192	torqueQShaft Regulator Proportional Gain1	Pn194	torqueQShaft Regulator Proportional Gain2
Pn193	torqueQShaft regulator integral time constant1	Pn195	torqueQShaft regulator integral time constant2
Pn196	torqueQAxis filter time constant1	Pn197	torqueQfilter time constant2
Pn115	position regulator gain1	Pn116	position regulator gain2

Note: When the gain is switched, it must be in the appropriate control mode and set the parametersPn0465,Pn046Only when the condition is suitable can the gain switching condition be satisfied.

to switch.



Gain switching timing chart

appendixBControl mode switching

B.1Position/speed control mode switching

Use the control toggle (cmode), the position control mode and speed control mode can be switched through the input control port SigIn contact Change.

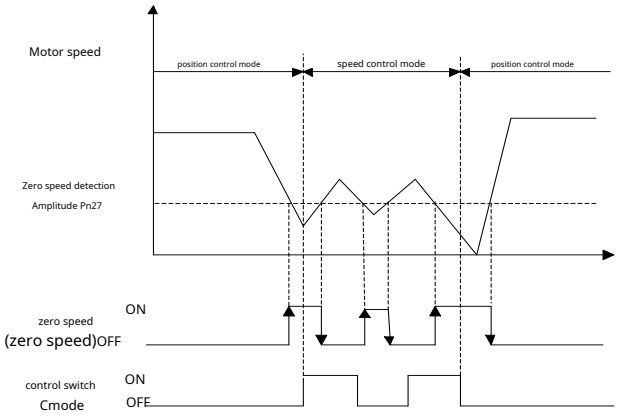
cmodeThe relationship with the control mode is as follows.

Cmode	control mode
OFF	position control mode
ON	speed control mode

The control mode can be switched in zero speed state. But to be safe, do the switching when the servo motor is stopped. Droop pulses will be cleared when switching from position control mode to speed control mode. Before enabling the motor, please confirm the control to be entered control mode (state of the cmode pin). When the motor is enabled, there are two switching modes, the timing diagram is as follows:

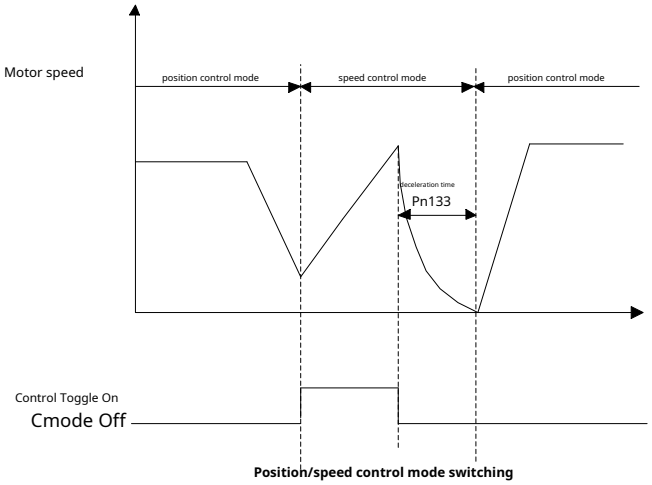
◢ Pn132=0:

Only when the switching signal changes in the zero speed state, the mode switching is valid; if it is not in the zero speed state, the switching signal changes, and then the signal enters the zero speed state, then the mode switching does not occur.



Position/speed control mode switching

◢ Pn132=1:



Position/speed control mode switching

B.2Position/torque control mode switching

Use the control toggle (cmode), the position control mode and torque control mode can be switched through the input control port SigIn contact.cmodeThe relationship with the control mode is as follows.

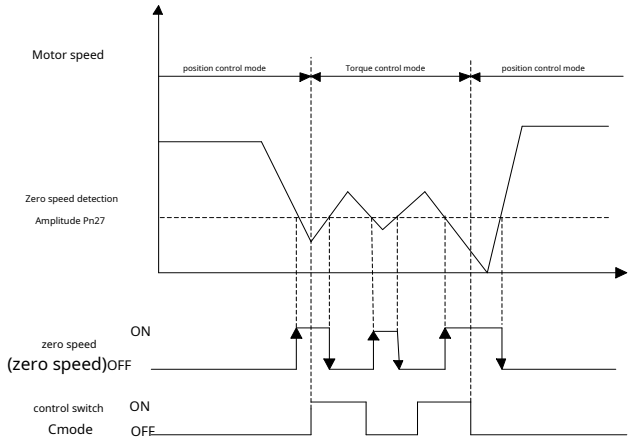
Cmode	control mode
OFF	position control mode
ON	Torque control mode

The control mode can be switched in zero speed state. But to be safe, do the switching when the servo motor is stopped.

When switching from position control mode to torque control mode, the droop pulse will be cleared. When the motor is enabled, there are two switching modes, the timing diagram is as follows:

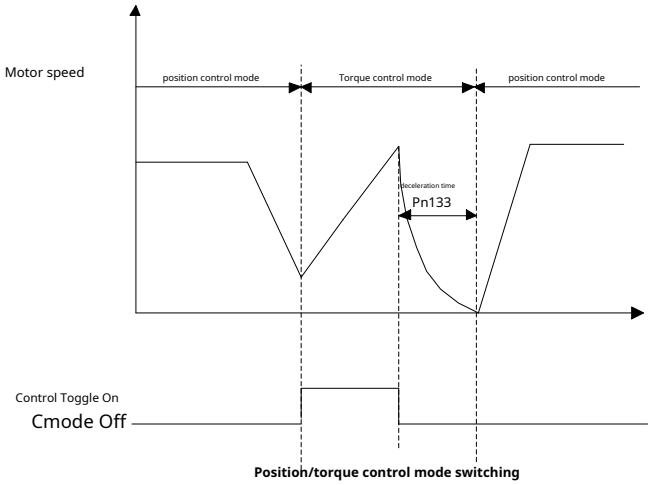
◢ Pn132=0:

Only in the state of zero speed, the switching signal changes, and the mode switching is valid; if it is not in the state of zero speed, the switching If the signal changes and then the signal goes to the zero speed state, no mode switch occurs.



Position/torque control mode switching

◢ Pn132=1:



Position/torque control mode switching

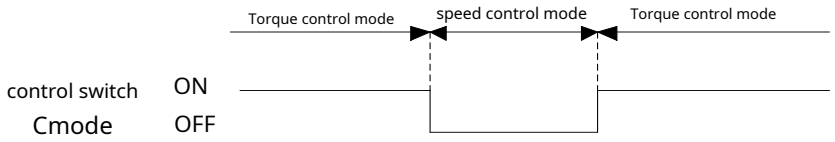
B.3Speed/torque control mode switching

Use the control toggle (cmode), the speed control mode and torque control mode can be switched through the input control port SigIn contact.

cmodeThe relationship with the control mode is as follows.

Cmode	control mode
OFF	speed control mode
ON	Torque control mode

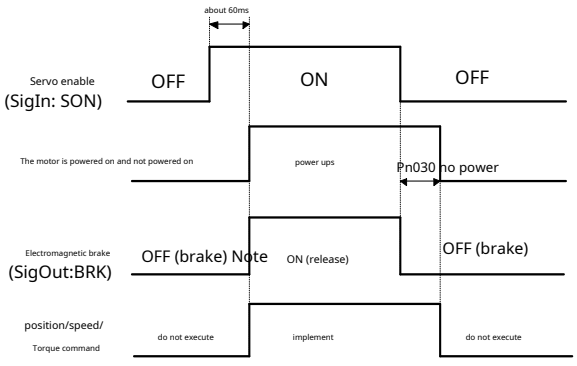
The control mode can be switched at any time, and the timing diagram of the switch is as follows:



Speed/torque control mode switching

appendixCServo drive working sequence

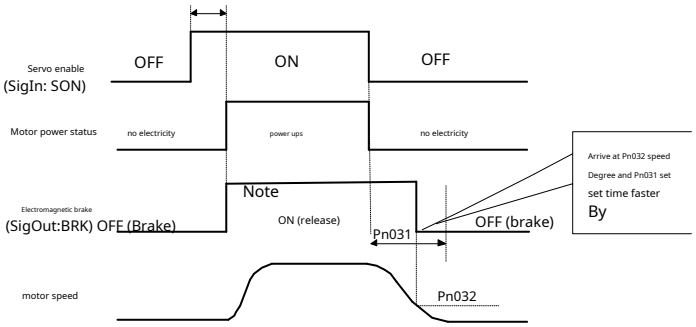
C.1when the motor is stationaryON/OFFAction sequence



Note1: When the electromagnetic brake function is used, the servo off enable modePn004must be set to2.

Note2: When the motor speed is lower than the parameterPn029, the action sequence of the electromagnetic brake.

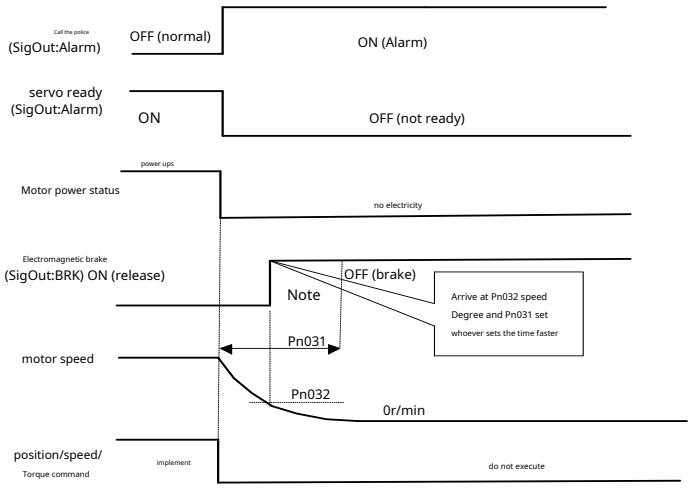
C.2while the motor is runningON/OFFAction sequence



Note1: When the electromagnetic brake function is used, the servo off enable modePn004must be set to2

Note2: When the motor speed is not lower than the parameterPn029When the value is set, the action sequence of the electromagnetic brake.

C.3servoONtiming of alarm



Note1: When the electromagnetic brake function is used, the servo off enable modePn004must be set to2

appendixD.Electromagnetic brake

Electromagnetic brakes (holding brakes, power-off brakes), used to lock the vertical or inclined table connected to the motor, preventing servo power Workbench falls when lost. To realize this function, a motor with a brake must be purchased. The brakes should only be used to hold the table, never to reduce Speed up and stop machine movement.

To use an electromagnetic brake, it is necessary to setPn004The parameter is2,and inSigOutPort designation function. According to the rotation speed of the motor, the driver

According to parametersPn029Set the value, select the corresponding braking sequence, and perform the electromagnetic braking function. See the specific timing for detailsappendixC .

appendixE.Regenerative braking resistor

When the servo motor is running in the generator mode, the electric energy will flow from the motor to the driver, which is called regenerative power.force. The following usage conditions will make the server

Servo motor running in generator (regeneration) mode:

(1) During acceleration and deceleration of the servo motor, the period from deceleration to stop.

(2) When applied to a vertical load.

(3) When the servo motor is driven by the load end.

This regenerative powerforceIt will be absorbed by the main circuit filter capacitor of the drive, but the regenerative powerforceToo much, when the filter capacitor can not bear, must use

Use a regenerative resistor to consume excess regenerative power. When the regenerative energy is too large, the internal braking resistor cannot fully absorb it, resulting in AL-03 (over

pressure), AL-08 (over temperature) or AL-16 (brake average power overload) and other alarms. According to the actual application, increase the acceleration and deceleration time, if the alarm still occurs,

An external braking resistor is required to enhance the braking effect. The resistance value range of the external braking resistor is 40~200 ohms, the power is 1000~50W, the smaller the resistance value,

The greater the braking current, the greater the power of the required braking resistor and the greater the braking energy, but if the resistance is too small, the driver may be damaged. The test method is

The resistance value is changed from large to small until the driver no longer alarms, and the temperature of the braking resistor is not too high when it is running at the same time. When external braking resistor is connected, remove

Go to the internal regenerative braking resistor. Since the regenerative resistor will generate a high temperature of over 100°C when consuming regenerative power, please be careful when connecting

Please use heat-resistant and non-flammable wires for the regenerative resistor, and make sure that the regenerative resistor does not touch anything.

Note: If the above alarm occurs when using the regenerative resistor, please cut off the power supply and let it cool down for a period of time. Due to failure of the regenerative transistor,

The regenerative resistor overheats abnormally, which may cause a fire. Please be sure to select a matching braking resistor according to the application.

appendixfReturn to origin

F1.1 Operation steps of homing

1: Find a reference point

After starting the homing function, search for the reference point according to the first speed of adding homing to the origin, and use the SigIn input terminal REF, CCWL or CWL

As a reference point, Z pulse can also be used as a reference point, and the forward or reverse direction can be selected to search.

2: Find the origin

After finding the reference point, search for the origin at the second speed. You can choose to continue forward or backward to find the Z pulse, or you can directly use the reference Point as the origin.

During the homing process, in order to avoid the mechanical shock caused by the drastic speed change, the parameters Pn040 and Pn041 can be set for acceleration and deceleration.

The found origin plus the offset pulse is used as the actual origin, and the offset is: Pn036*10000+Pn037.

The origin return reference point mode (Pn034) and the origin mode (Pn035) have the following combinations:

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

Among them, √ means that the origin mode combination will be executed normally, and × means that the origin mode combination will not be executed.

F1.2 Origin return trigger sequence

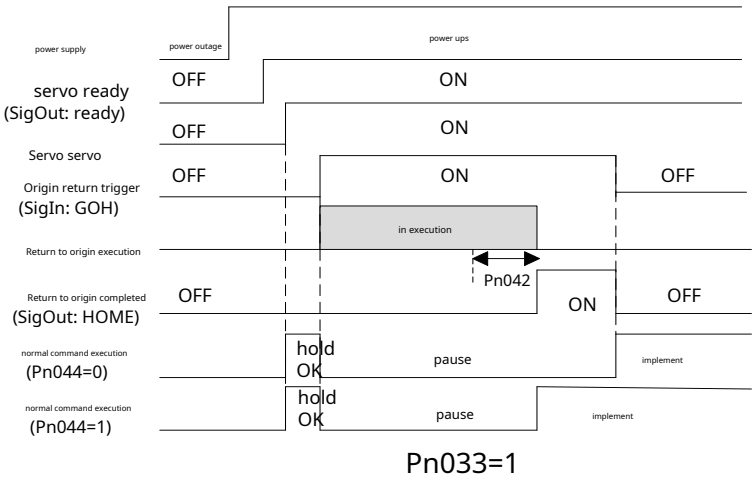
Pn033	Origin return trigger Mode	0:Turn off the homing function 1: Input by SigInGOHlevel trigger 2: Input by SigInGOHedge trigger 3: Automatically execute once when power on

● Level trigger (Pn033=1)

After the servo is enabled, the input terminalGOHTrigger homing execution,GOHThe upper edge starts the homing operation, suspends normal instruction execution, and the lower edge ends Beam regression operation.GOHRemainsON,After the return is executed, the position deviation is cleared (position control), and the output terminalHOMEbecomesON. until GOHbecomesOFF,butHOMEbecomesOFF.

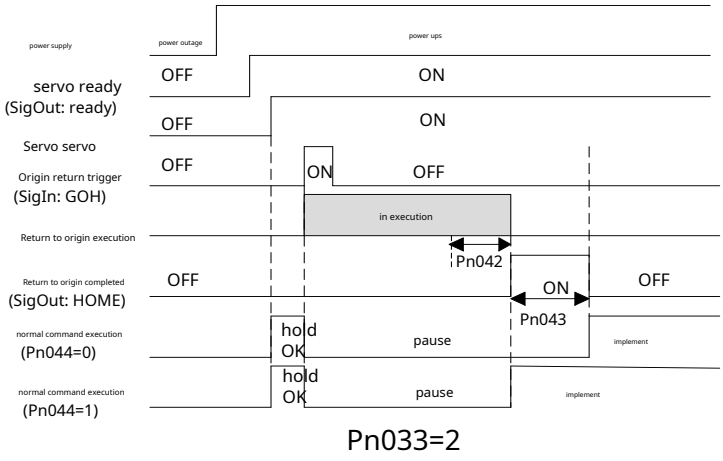
whenPn044=0, wait for the return-to-origin to completeGOHsignal becomesOFFExecute the instruction again, the motor stays at the origin during the waiting period, and does not accept instruction; whenPn044=1, execute the command immediately after the homing is completed.

During homing execution, if the servo enable is canceledson, generate any alarm,GOHbecome ahead of timeOFF, the homing function is terminated and output terminalHOMEno action. Additionally, if enabledsonactive, no alarm, homing in progress and not completed, even if edge triggered (Pn033=2) signal is valid repeatedly, the driver will detect the edge trigger signal after completing the current homing operation.



● edge triggered (Pn033=2)

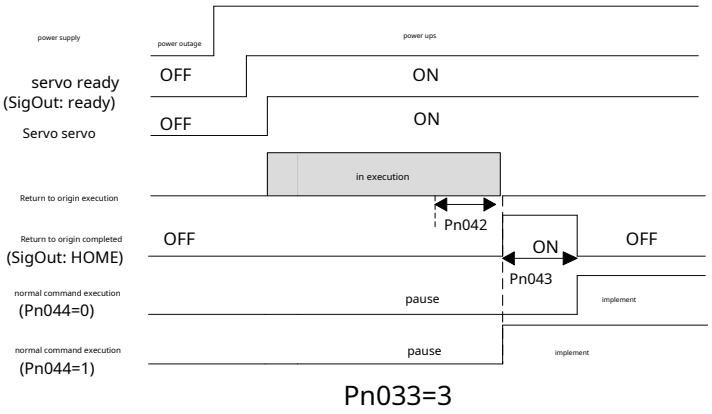
After the servo is enabled, the input terminalGOHRise triggers homing execution and suspends normal instruction execution



● Power-on automatic execution (Pn033=3)

This function is only executed once when the servo is enabled for the first time after power-on, and there is no need to repeat the homing operation in the future.

Every time the power is turned on, the drive will automatically perform an origin return operation. Use this function to save an input terminalGOH.



F1.3Timing of home return combination mode

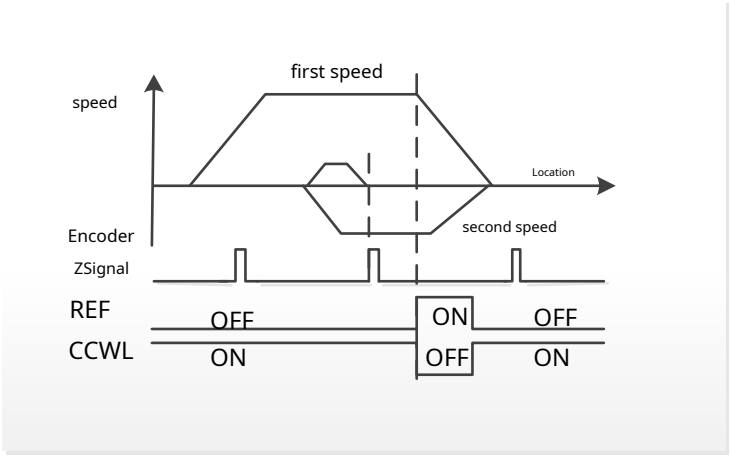
Pn034	Return to origin reference dot pattern	0:forward lookingREF(Rising edge trigger) as a reference point 1:Reverse to findREF(Rising edge trigger) as a reference point 2:forward lookingCCWL(falling edge trigger) as a reference point 3:Reverse to findCWL(falling edge trigger) for reference 4:forward lookingZpulse as reference point 5:Reverse to findZpulse as reference point 6:Absolute zero as reference point (only valid for absolute encoder)	0~6	0
Pn035	Return to the origin model	0: look backwardZpulse as origin 1: look forwardZpulse as origin 2: Directly take the rising edge of the reference point as the origin	0~2	0

Note1: by combining parametersPn034andPn035,have8available homing methods.

Note2: During the homing operation, the forward/reverse drive prohibition function will be closed until the homing operation is exited.

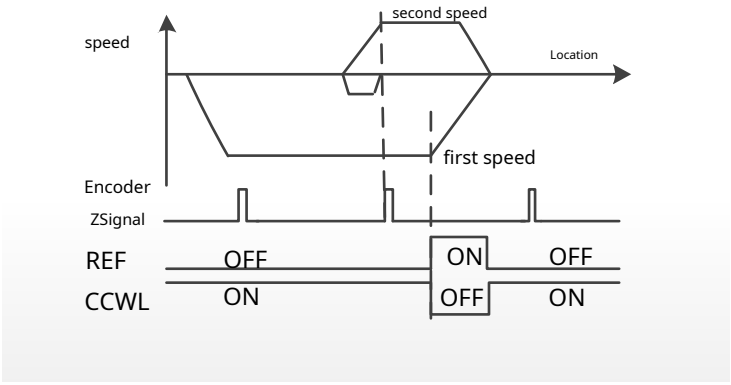
(A)Pn034=0or2, Pn035=0

parameter	set up	illustrate
Pn034	0or2	After the homing starts, press the first speed of homing to findREF(rising edge trigger) or CCWL(falling edge trigger) as a reference point
Pn035	0	After reaching the reference point, press the return second speed to look backwardZpulse as origin



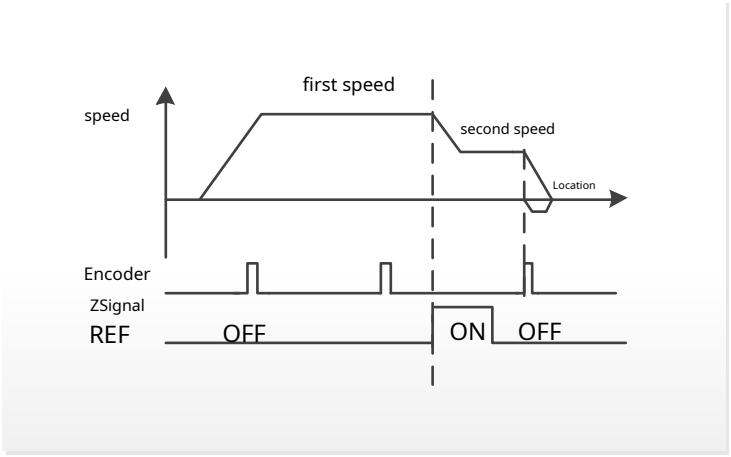
(B)Pn034=1or3, Pn035=0

parameter	set up	illustrate
Pn034	1 or 3	After homing starts, press the first speed of homing to reverse to findREF(rising edge trigger) or CWL(falling edge trigger) as a reference point
Pn035	0	After reaching the reference point, press the return second speed to look backwardZpulse as origin



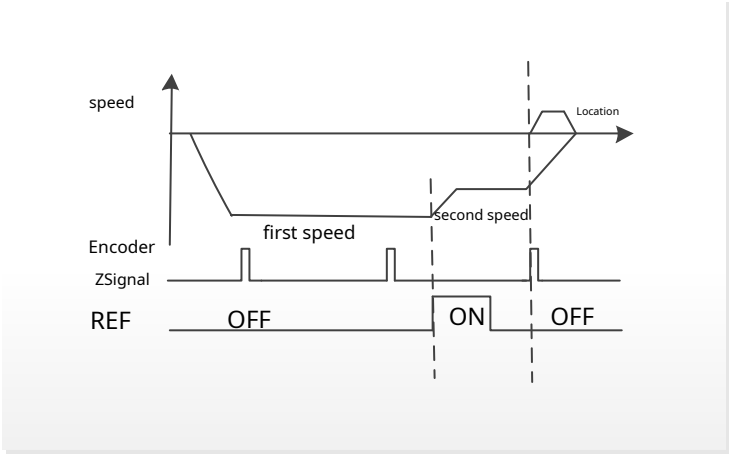
(C)Pn034=0,Pn035=1

parameter	set up	illustrate
Pn034	0	After the homing starts, press the first speed of homing to findREF(Rising edge trigger) as a reference point
Pn035	1	After reaching the reference point, press the return second speed to look forwardZpulse as origin



(D)Pn034=1,Pn035=1

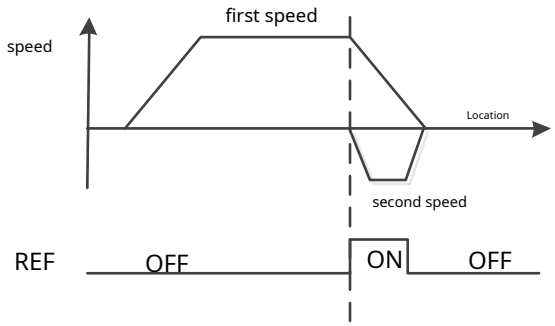
parameter	set up	illustrate
Pn034	1	After homing starts, press the first speed of homing to reverse to findREF(Rising edge trigger) as a reference point
Pn035	1	After reaching the reference point, press the return second speed to look forwardZpulse as origin



(E)Pn034=0,Pn035=2

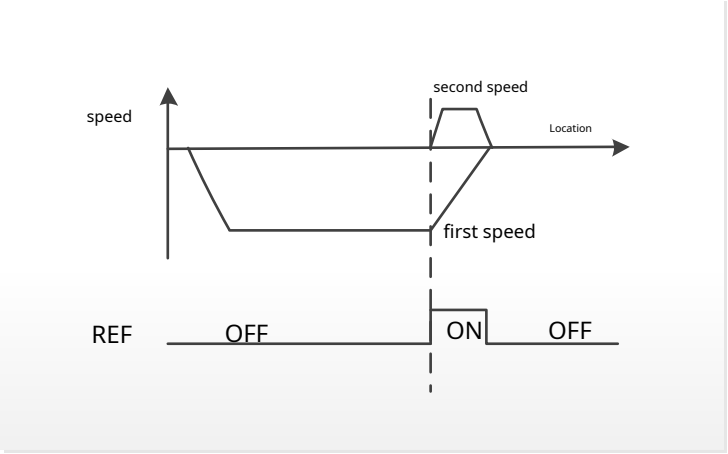
parameter	set up	illustrate
Pn034	0	After the homing starts, press the first speed of homing to findREF(rising edge trigger) for reference point

Pn035	2	After reaching the reference point, take the reference point as the origin directly



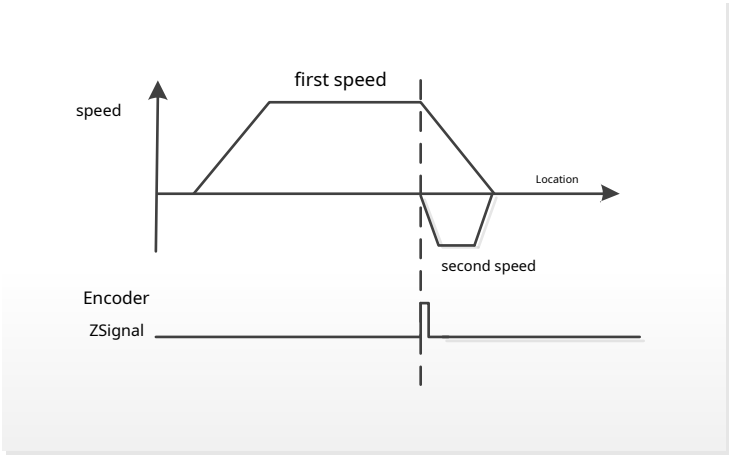
(F)Pn034=1,Pn035=2

parameter	set up	illustrate
Pn034	1	After homing starts, press the first speed of homing to reverse to findREF(Rising edge trigger) as a reference point
Pn035	2	After reaching the reference point, take the reference point as the origin directly



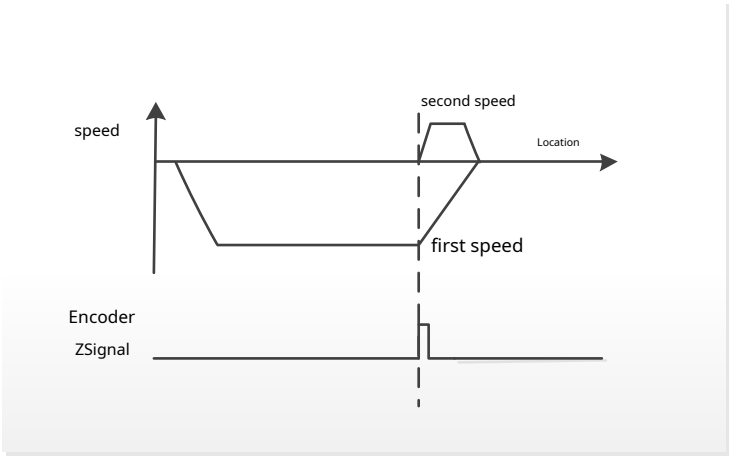
(G)Pn034=4,Pn035=2

parameter	set up	illustrate
Pn034	4	After the homing starts, press the first speed of homing to findZpulse as reference point
Pn035	2	After reaching the reference point, take the reference point as the origin directly



(H)Pn034=5,Pn035=2

parameter	set up	illustrate
Pn034	5	After homing starts, press the first speed of homing to reverse to findZpulse as reference point
Pn035	2	After reaching the reference point, take the reference point as the origin directly



(I) Pn034=6, Pn035=2

parameter	set up	illustrate
Pn034	6	Absolute motor absolute zero as reference point
Pn035	2	After reaching the reference point, take the reference point as the origin directly

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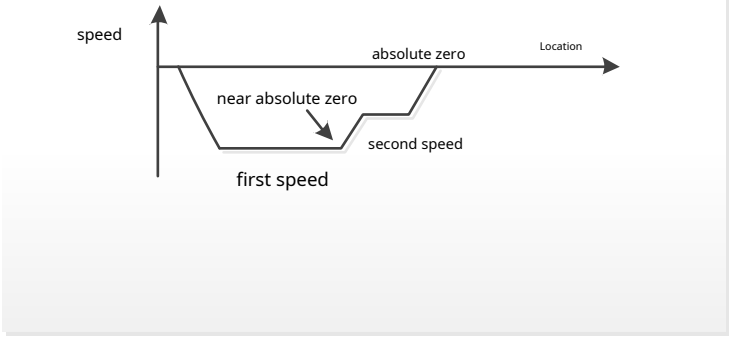


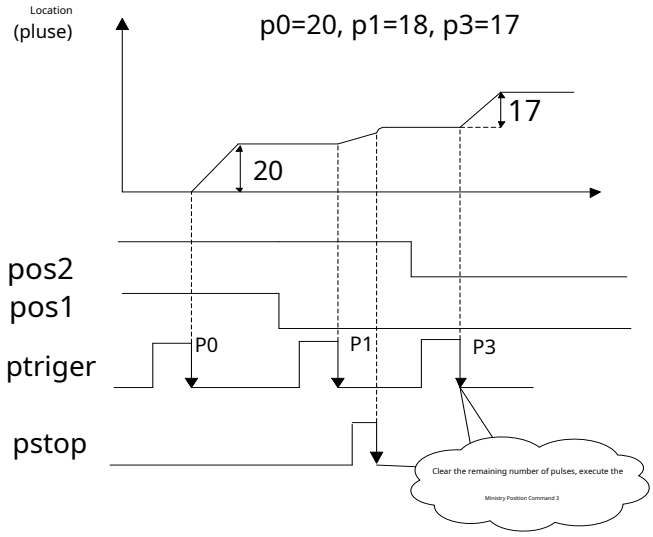
appendixGinternal position control

For internal position control, you need to setPn002=2, Pn117=1, and inPn118~Pn131Set the corresponding operating parameters.SigInport ofpos1 ,pos2Select internal position commandN:

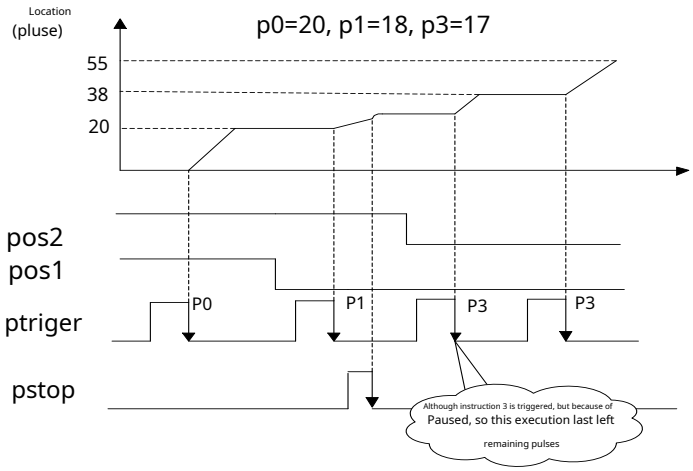
Pos2	Pos1	internal position commandN
Off	Off	internal position command0
Off	On	internal position command1
On	Off	internal position command2
On	On	internal position command3

When using internal position control, first determine the input portpos1, pos2state, that is, select the corresponding internal position command, and then trigger the input Signalptriger,every timeptriger(OFF->ON)When the falling edge, the drive reads the internal position commandN, accumulated to the remaining number of command pulses, followed by Continue to perform corresponding operations.

if setPn118=0,If you want to suspend the motor operation during the position movement, when the input port is triggeredpstopsignal, the motor decelerates and stops, and then After the driver automatically clears the remaining position command, when the input portptrigerWhen triggered again, the drive willpos1,pos2status, perform Execute the corresponding position command, please refer to the following sequence diagram:



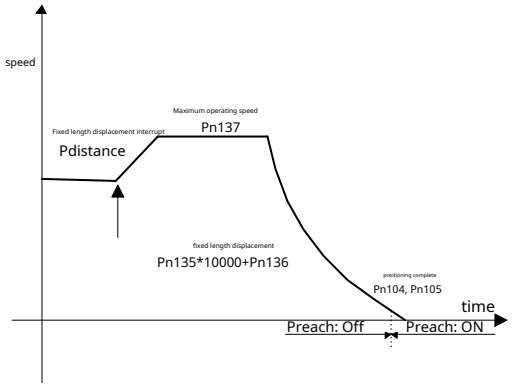
if setPn118=1,Pause the motor during the position movement, when the input port is triggeredpstopsignal, the motor decelerates to stop, when input portptrigerWhen triggered again, the motor will continue to complete the remaining position commands and reach the input portpstopTargets issued before the trigger location, please refer to the timing diagram below:



appendixhFixed length displacement interrupt

The relevant parameters of fixed-length displacement are as follows:

Pn134	Fixed length displacement direction	0~1	0		P
Pn135	Fixed length displacement high position	0~9999	0	ten thousand	P
Pn136	Fixed length displacement low position	0~9999	100	indivual	P
Pn137	fixed length maximum running speed	5~5000	200	r/min	P
Pn138	Fixed-length lock release method	0~1	1		P



Fixed-length displacement interruption means that the motor is running or stopped under position control mode. When the input port signal SigIn: Pdistance edge is valid, the motor will move a specific distance (Pn135*10000+Pn136) according to the original speed direction (Pn134). During the execution of fixed-length displacement, the servo is in the fixed-length displacement locked state, and will ignore other position commands (including Pdistance and Punlock trigger signals). When the fixed-length distance is completed and the positioning completion conditions (Pn104, Pn105) are met, the signal output of the SigOut: Preach port turns On. Afterwards, the driver executes the corresponding unlocking method according to the setting of the unlocking method (Pn138). If Pn138 is 0, the position command will be responded immediately after the positioning is completed; if Pn138 is 1, the locked state will be released and the position command will be responded to only after the edge of the input port SigIn:Punlock signal is valid. SigIn: Pdistance, Punlock and SigOut: Preach port signals need to be set in Pn052~Pn063 and other parameters accordingly.

Note 1: The larger the setting of the positioning completion parameters Pn104 and Pn105, the earlier the Preach signal will turn On, but it will not affect the final positioning accuracy in the locked state. If a small fixed-length displacement error is obtained when the preach signal becomes On, reduce the parameter values of Pn104 and Pn105 or wait for the motor to stop.

Note 2: Position command acceleration and deceleration mode (Pn109) must be set to 0.