

0	1	Forced to high level	0	1	Forced to high level
1	0	Forced to low level	1	0	Forced to low level
1	1	Optional state	1	1	Optional state

Example: output port SigOut2 force output low level, other optional output port status, setting Pn082 parameter value is 8.

number	name	value range	the default value	unit	apply
Pn083	low pressure alarm detect amplitude	50~280	200	V	All

▲ When the bus voltage is less than the amplitude, the Pn078 decided whether to send out alarm

number	name	value range	the default value	unit	apply
Pn084	high pressure alarm detect amplitude	290~380V	365	V	All

▲

When the bus voltage is higher than the amplitude, immediately issued a warning, in order to protect the internal electronic components. Input power supply voltage should be within the specifications of the acceptable, if slightly on the high side, can be appropriately increase amplitude detection. If the input voltage power supply has been far beyond specification, shall not increase the parameter value, otherwise it will damage the driver, please conform to the specifications of the power supply.

number	name	value range	the default value	unit	apply
Pn085▲	Motor pole logarithmic	1~100	4	对	All

number	name	value range	the default value	unit	apply
Pn086	Renewable circuit discharge cycle	0~2000	70	ms	All

▲ When the servo motor running in generator mode, renewable electricity too

much, must through the regeneration way discharge, otherwise the internal voltage is too high, damage to the drive. Set up, the longer the voltage release faster, but the greater the power needed for regenerative resistor, otherwise easy to burn regenerative resistor. See appendix E specific Settings.

#### 4.3.2 Position control parameters

number	name	value range	the default value	unit	apply
Pn096▲	The command pulse input mode	0-2	0		P
Pn097▲	Instruction selection logic pulse input direction	0-1	0		P

▲ Command pulse input mode in the following table:

Pn096		Forward command	reverse command
0	Pulse + direction		
1	Forward/reverse pulse		
2	The orthogonal pulse		

▲ Pn097 = 0: input command, the motor rotate counterclockwise (CCW)

Pn097 = 1: input command, motor rotate clockwise (included)

number	name	value range	the default value	unit	apply
Pn098	Pulse electronics gear than the molecules of 1	1~32767	1		P
Pn099	Pulse electronics gear than the molecules of 2	1~32767	1		P
Pn100	Pulse electronics gear than the molecules of 3	1~32767	1		P

Pn101	Pulse electronics gear than the molecules of 4	1~32767	1		P
Pn102▲	Pulse electronics gear than the denominator	1~32767	1		P

▲ Electronic gear ratio must meet the following conditions, otherwise will not work:

Electronic gear or less than 1/127 of 127 or less

▲ Electronic gear than the molecules of N by the input port of the SigIn GN1, GN2 decision.

The denominator is fixed. Molecules to choose in the following table:

GN2	GN1	Electronic gear than N
OFF	OFF	Molecular 1
OFF	ON	Molecular 2
ON	OFF	Molecular 3
ON	ON	Molecular 4

number	name	value range	the default value	unit	apply
Pn103	Beyond the scope of setting position deviation	1~ 500	50	Thousands p of Pulse	

▲ Deviation when the pulse counter pulse count more than the value set (i.e., the current position and

target location are too large), drive out alarm signal.

number	name	value range	the default value	unit	apply
Pn104	Complete range set position location	0~ 32767	10	pulse	P
Pn105		0~ 32767	3	pulse	P

	Positioning to complete set				
--	-----------------------------	--	--	--	--



While the rest of the deviation counter pulse number is lower than the parameters setting, output port SigOut Preach signal is ON, or OFF.

number	name	value range	the default value	unit	apply
Pn106	Position location close to the range of Settings	0~ 32767	300	Pulse	P
Pn107	Position location close to the poor set back	0~ 32767	30	Pulse	P



While the rest of the deviation counter pulse number is lower than the parameters setting, output port SigOut Pnear signal is ON, or OFF.

编号 number	name	value range	the default value	unit	apply
Pn108	Position deviation clear way	0-1	1		P

▲ Position control, can use SigIn Pclear function, clear position deviation value of the counter.

Position deviation clearance in -

0: Pclear level ON period

1: Pclear rise along time (from OFF to ON)

number	name	value range	the default value	unit	apply
Pn109◆	Position command deceleration mode	0-2	1		P

▲ 0 Do not use the filter

▲ 1 A smoothing filter

▲ 2 S-shaped filtering

number	name	value range	the default value	unit	apply
Pn110◆	Position command s-shaped	5~1750	50	ms	P

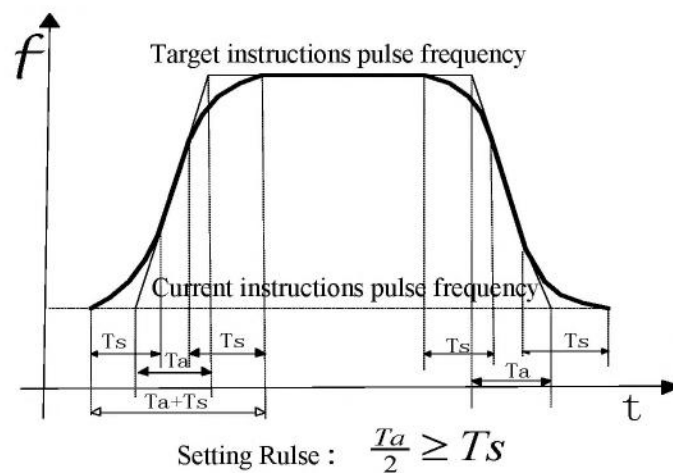
	filtering time constant				
Pn111◆	Ta S-shaped filtering time constant Ta position instruction	5~1200	50	ms	P
Pn112◆	Ts S-shaped filtering time constant Ts position instruction	5~550	20	ms	P



Filter time constant is defined by the current location instructions frequency operation to the target frequency. Filtering, the longer the better position instruction frequency smoothness, but command the greater the response delay. In instruction pulse frequency step change, have the effect of smooth running motor. The filter has no effect on instruction pulse number.



Filtering time  $T = T_a + T_s$ .  $T_a$ : straight line part of the time, the smaller the  $T_a$ , the faster the deceleration.  $T_s$ : arc part time,  $T_s$ , the greater the speed is smooth, the smaller the impact.



number	name	value range	the default value	unit	apply
Pn113▲	The position loop feedforward gain	0-100	0	%	P
Pn114▲	Position loop feedforward filter time constant	1-50	5	ms	P



Position control, position feedforward directly on the speed instruction, can reduce the position tracking error, improve the response. If the feedforward gain is too big, can lead to speed overshoot. To smooth the feedforward commands.

number	name	value range	the default value	unit	apply
Pn115	The position controller gain 1	5-2000	100	%	P
Pn116	The position controller gain 2	5-2000	100	%	P



In

mechanical systems do not produce under the premise of vibration or noise, increase the position loop gain value, to speed up the reaction rate, shorten the positioning time.

number	name	value range	the default value	unit	apply
Pn117	Position command source selection	0~1	0		P

▲ 0 The external input pulse

▲ 1 Internal location instructions (see appendix G)

number	name	value range	the default value	unit	apply
Pn118	Internal position instruction suspend mode selection	0~1	0		P

▲ 0 When pstop the trigger action, ptriger trigger again, according to the currently selected internal drive position command to run.

▲ 1 When pstop the trigger action, ptriger trigger again, drive to continue to complete the last remaining internal position command pulse number.

number	name	value range	the default value	unit	apply
Pn119	Internal position suspended deceleration time	0~10000	50		P

- ▲ Falling edge position in internal control, pstop, motor by the current running speed will slow down to zero, the deceleration time can be set by this parameter (only for internal position control).

number	name	value range	the default value	unit	apply
Pn120	Internal position 0 high pulse number set up	-9999~9999	0	ten thousand pulse	P
Pn121	Internal position 0 low pulse number set up	-9999~9999	0	↑	P
Pn122	Internal position 1 high pulse number set up	-9999~9999	0	ten thousand pulse	P
Pn123	Internal position 1 low pulse number set up	-9999~9999	0	piece	P
Pn124	Internal position 2 high pulse number set up	-9999~9999	0	ten thousand pulse	P
Pn125	Internal position 2 low pulse number set up	-9999~9999	0	piece	P
Pn126	Internal position 3 high pulse number set up	-9999~9999	0	ten thousand pulse	P
Pn127	Internal position 3 low pulse number set up	-9999~9999	0	↑	P

- ▲ Internal location instructions N (pulse) = internal position number N pulse high value x 10000 + internal position instruction N pulse number value low

- ▲ Example: the encoder 2500 line, to go travel 12.5 turn, is set Pn120 = 12, Pn121 = 5000.

number	name	value range	the default value	unit	apply
Pn128	Internal position command zero speed	0~3000	100	r/min	P
Pn129	Internal position command 1 speed	0~3000	100	r/min	
Pn130	Internal position command 2 speed	0~3000	100	r/min	P
Pn131	Internal position command 3 speed	0~3000	100	r/min	P

▲ When performing internal position instruction N, restrict the highest speed of motor can run.

number	name	value range	the default value	unit	apply
Pn132	Torque/speed control switch to the position control	0~1	0		P

▲ Control mode from the speed/torque mode conversion to position control

(Pn002 = 3 or 4), to avoid severe mechanical shock, should be in low speed switching.

The conditions of the switch can be set up:

Pn132=0: zerospeed)

Pn132=1: Slow down to zero

number	name	value range	the default value	unit	apply
Pn133	Torque/speed control switch to the position control of the deceleration time	5-10000	100	ms	P

▲ Pn132 = 1, when cmode signals effectively, the order control



mode by the torque/speed control switch to the position control, motor slow down to zero, then switch to the position control mode. Please refer to the appendix B for specific timing.

### 4.3.3 Speed control parameter

number	name	value range	the default value	unit	apply
Pn146◆	Speed instruction deceleration mode	0~2	1		S

▲ Pn146=0: Do not use the speed instruction deceleration function

Pn146=1: Using the speed instruction S curve deceleration function

Pn146=2: Use linear deceleration function

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

number	name	value range	the default value	unit	apply
Pn147◆	Speed instruction S curve and deceleration time constant Ts	5~ 1500	80	ms	S
Pn148◆	Speed instruction S curve acceleration time constant of Ta	5~ 10000	80	ms	S
Pn149◆	Speed instruction S curve deceleration time constant of Td	5~ 10000	80	ms	S

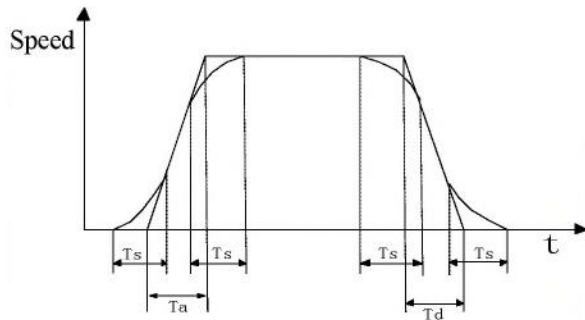
▲ In speed control mode, you can set the speed instruction, deceleration time, in order to smoothly to start and stop the servo motor.

▲ Ta: acceleration time: from 0 r/min to rated speed. For

example, servo motor rated speed 3000 r/min, if the setting time is 3 s, accelerate from 0 r/min to 1000 r/min for 1 s.

Td: Deceleration time: by the rated speed reduced to 0 r/min

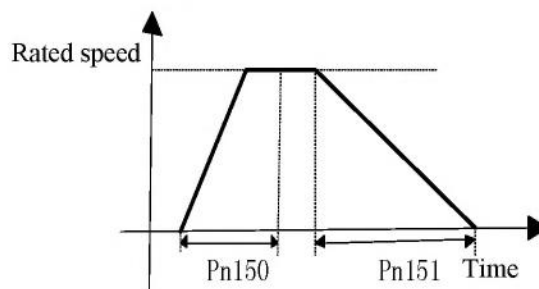
Ts: Arc part time



Setting Rules :  $\frac{T_a}{2} \geq T_s, \frac{T_d}{2} \geq T_s$

number	name	value range	the default value	unit	apply
Pn150◆	Linear acceleration time constant	5~30000	80	ms	S
Pn151◆	Linear deceleration time constant	5~30000	80	ms	S

▲ Accelerating time constant is defined as the speed instruction from zero to rated speed.



number	name	value range	the default value	unit	apply
Pn152▲	Speed detection filter time constant	1~380	10	0.1ms	All

▲ The smooth the speed of the parameter value, the greater the detected, but lead to the slower speed response. Too easy to cause the oscillation, too small may lead to noise.

number	name	value range	the default value	unit	apply
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Pn153	The speed regulator proportional gain 1	5~ 2000	100	%	All
Pn154	Speedregulator integral time constant of 1	5~ 2000	100	%	All
Pn155	The speed regulator proportional gain 2	5~ 2000	100	%	All
Pn156	Speed regulator integral time constant 2	5~ 2000	100	%	All

▲ Speed loop controller gain directly determine the response of the speed control loop bandwidth, the mechanical system without vibration or noise, increase the speed loop gain value, accelerated the response.

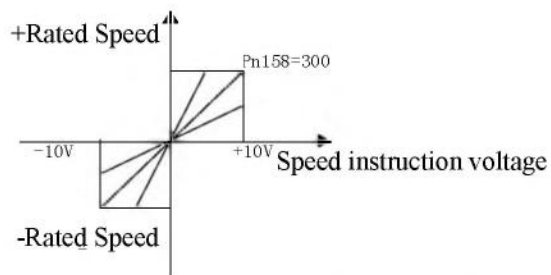
▲ Integral time constant is used to adjust the steady-state error compensation rate, decrease the parameter values, reduce the speed control error, increase rigidity. Is too small easy to cause vibration and noise.

number	name	value range	the default value	unit	apply
Pn157▲	Simulation speed instruction smoothing filtering time	1~500	1	0.1ms	s

▲ The set value, the greater the input analog response speed is slow, is beneficial to reduce the high frequency noise, setting is smaller, the faster response speed, but will get big interference noise.

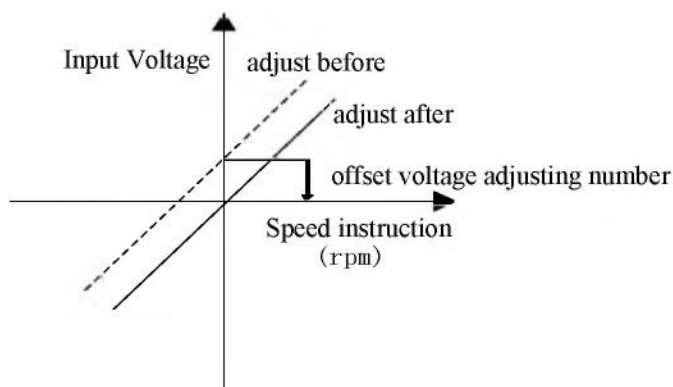
number	name	value range	the default value	unit	apply
Pn158	The directive gain simulation speed	1~1500	300	r/min/V	s

▲ Analog speed reference input and the ratio between the actual speed motor. The range of input voltage - 10 ~ 10 v. Formula: speed = \* Pn158 input voltage. For example: when the input voltage of 10 v, if set to 300, the corresponding rate of  $10 * 300 = 3000$  r/min.



number	name	value range	the default value	unit	apply
Pn159	Simulation speed instruction offset adjustment	-5000~5000	mv		s

▲ May occur in the analog input offset phenomenon, can through this parameter.



▲ Automatic offset adjusting, perform Fn008 operations.

▲ Manually adjust the migration steps are as follows:

1 The external zero potential access to the analog input port

2 This parameter is zero, the monitor dn17 shows the value of the model.

3 If observed values are not zero, negative observation value to the input parameters, can be realized to adjust (note that the voltage unit conversion relationship).

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

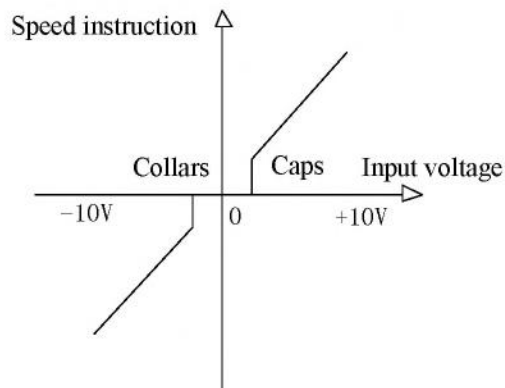
number	name	value range	the default value	unit	apply
Pn160		0-1	0		s

	Simulation speed instruction direction				
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- ▲ 0 Positive voltage forward (CCW), negative voltage inversion (the cw)
- ▲ 1 Positive voltage forward (CCW), negative voltage inversion (the cw)

number	name	value range	the default value	unit	apply
Pn161	Simulation speed instruction to enforce zero range	0~1000	0	10mv	s
Pn162	Simulation speed instruction to enforce zero range	-1000~0	0	10mv	s

- ▲ Input speed instruction lies between floor and ceiling, forced to 0 V input instructions.



- ▲ When the input voltage is after adjusting for PN159 offset of the input voltage.
- ▲ Through the upper and lower set, can make the input instructions into a single polarity, double polarity. Example: the upper limit of 0, lower limit for - 1000, the equivalent input command range of 0 ~ 10 v, for normal polarity speed commands.

number	name	value range	the default value	unit	apply
Pn163	Zero speed clamp lock mode	0-1		0	s

▲ 0: Lock, the clamping position loop control is the mode, involved in internal ring loop control, gain by Pn167 Settings.

▲ 1 Locked, clamping way is speed loop control, speed instruction forced to 0, location may change due to external force.

number	name	value range	the default value	unit	apply
Pn164	Zero speed clamp is triggered	0~1		0	S

▲ 0: SigIn port ZeroLock to ON

▲ 1: Triggered when the speed instruction below Pn165 parameters

number	name	value range	the default value	unit	apply
Pn165	The clamp level zero speed	0~200	6	r/min	S

▲

When Pn164 is set to 1, and the speed instruction below this parameter value, the lock on the motor shaft. Example: this parameter is set to 10 r/min, if the analog speed instruction - 10 r/min ~ 10 r/min, within the scope of the deceleration clamp, in order to prevent the analog speed instruction near the zero drift, lead to the motor shaft instability.

number	name	value range	the default value	unit	apply
Pn166	Zero speed clamp deceleration time	5~10000	50	ms	S

▲ When zero velocity clamp when triggered, immediately according to deceleration time to slow down to zero, and then to lock.

number	name	value range	the default value	unit	apply
Pn167	internal position controller gain	5~2000	100	%	All

number	name	value range	the default value	unit	apply
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Pn168	Speed reference source	0~1	0		S
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▲ In speed control mode, the optional speed reference source:

Pn168=0: External simulation speed instruction within + 2 ~ 8

Pn168=1: Speed within 1 ~ 8

number	name	value range	the default value	unit	apply
Pn169	Internal speed reference 1	-5000-5000	0	R/min	S
Pn170	Internal speed reference 2	-5000-5000	0	R/min	S
Pn171	Internal speed reference 3	-5000-5000	0	R/min	S
Pn172	Internal speed reference 4	-5000-5000	0	R/min	S
Pn173	Internal speed reference 5	-5000-5000	0	R/min	S
Pn174	Internal speed reference 6	-5000-5000	0	R/min	S
Pn175	Internal speed reference 7	-5000-5000	0	R/min	S
Pn176	Internal speed reference 8	-5000-5000	0	R/min	S

▲ When a drive control mode in speed control mode, the speed reference source by the input port of the SigIn SP1, SP2, SP3 decision:

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

1	1	1	Internal speed 8
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Note 1: 0 is OFF, 1 is ON.

Note 2: if the Sign port is not specified SP3, SP2, SP1 function, is OFF by default

number	name	value range	the default value	unit	apply
Pn177	speed	0~5000	200	r/min	S
Pn178◆	speed up the time	5~ 10000	100	ms	S
Pn179◆	Deceleration time	5~ 10000	100	ms	S

▲ When commissioning at, can set the speed of the motor running and the deceleration time

#### 4.3.4 Torque control parameters

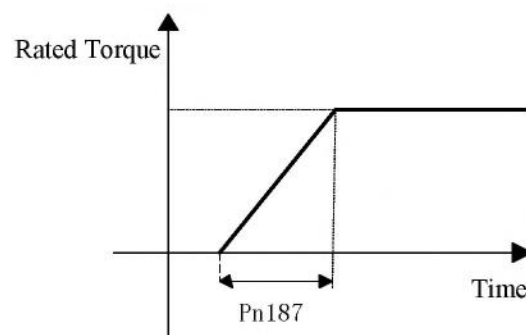
number	name	value range	the default value	unit	apply
Pn186	Torque command deceleration mode	0~1	0		T

▲ 0: Do not use the deceleration torque instruction

▲ 1 Using linear deceleration torque instruction

number	name	value range	the default value	unit	apply
Pn187▲	Linear deceleration time constant torque instruction	1~30000	1	ms	T

▲ Time constant is defined as a torque command from zero has soared to the rated torque.



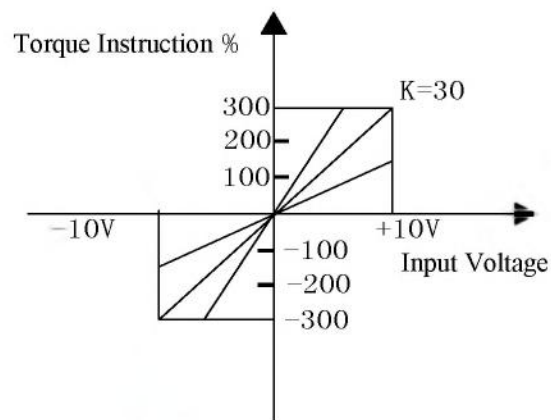


number	name	value range	the default value	unit	apply
Pn188▲	Analog torque instruction smooth filtering time	1~500	1	0.1ms	T

▲ The set value, the greater the input analog response speed is slow, is helpful to reduce the high frequency noise; Setup is smaller, the faster the speed of response, but will get big interference noise.

number	name	value range	the default value	unit	apply
Pn189	Analog gain torque instruction	1-300	30	%/V	T

▲ Analog torque command input and the ratio between the actual output torque. The range of input voltage - 10 ~ 10 v. The default input voltage of 10 v, motor at 3 times the rated torque, namely =  $KX = 30x$ , Y  $K = 30$ .



number	name	value range	the default value	unit	apply
Pn190	Analog torque instruction offset adjustment	-1500~1500	0	mv	T

▲ Adjust the way reference "simulation speed deviation adjustment directive"

	name	value	the	unit	apply
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number		range	default value		
Pn191	Simulation of torque command direction	0-1	0		T

▲ 0 Positive voltage forward (CCW), negative voltage inversion (the cw)

▲ 1 Turn negative voltage is (CCW), positive voltage inversion (the cw)

number	name	value range	the default value	unit	apply
Pn192	Q shaft torque regulator proportional gain is 1	5~ 2000	100	%	All
Pn193	Q shaft torque regulator integral time constant of 1	5~ 2000	100	%	All
Pn194	Q shaft torque regulator proportional gain is 12	5~ 2000	100	%	All
Pn195	Q shaft torque regulator integral time constant of 2	5~ 2000	100	%	All

▲ Increase the proportional gain, can make the Q axis current response speed.

▲ Reduce the integral time constant, can reduce the Q axis current control error

number	name	value range	the default value	unit	apply
Pn196	Torque Q axis filter time constant of 1	1-500	1	0.1ms	All
Pn197	Torque Q axis filter time constant of 2	1~500	1	0.1ms	All

▲ Inhibits mechanical vibration, the larger the set values, the better the results, will

cause slow response and may cause oscillation; Set the value is smaller, the faster the response, but the mechanical conditions.

number	name	value range	the default value	unit	apply
Pn198	Torque control speed limit	0~4500	2500	r/min	T



When the torque control, motor speed limit in this parameter range. There was a phenomenon of speeding can prevent the light load. Speeding, speed control to reduce the actual torque intervention, but the actual speed will be slightly error.

number	name	value range	the default value	unit	apply
Pn199	Source of limited torque control speed choice	0~2	0		T

▲ Pn199=0 Restricted by Pn198 parameters

Pn199=1 Restricted by internal speed instruction 1 ~ 8

Pn199=2: If Pn204 = 1, i.e., all instructions from the internal torque, torque, speed can be restricted by analog voltage speed command

▲ All the above speed limit both positive and negative, multiple speed limit, restricted to the minimum speed.

▲ If this parameter is set to 1, restricted by internal speed instruction, by sp1, sp2, sp3 limited decision speed value:

SP3	SP2	SP1	Speed instruction
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

1 0 means OFF, 1 is ON.

▲ Even if the setting values than the system allows the highest speed, the actual speed can limit under the highest speed.

number	name	value range	the default value	unit	apply
Pn200	The internal torque 1	-300~300	0	%	T

Pn201	The internal torque 2	-300~300	0	%	T
Pn202	The internal torque 3	-300~300	0	%	T
Pn203	The internal torque 4	-300~300	0	%	T

▲ Select the internal torque control mode, use input port of the SigIn TR1 TR2 can choose 4 kinds of torque command:

TR2	TR1	Torque command
0	0	The external torque 1 or internal analog torque instruction (decided by Pn204)
0	1	The external torque 2
1	0	The external torque 3
1	1	The external torque 4

NOTE: 1 0 means OFF, 1 is ON.

Note 2: if the SigIn port doesn't specify TR2, TR1 functions, is OFF by default.

number	name	value range	the default value	unit	apply
Pn204	Torque command source	0~1	0		T

0: external analog torque command

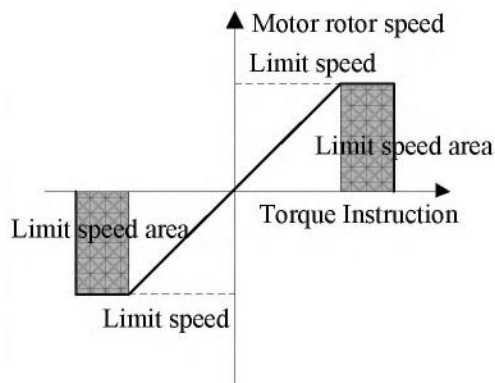
1: internal torque 1

number	name	value range	the default value	unit	apply
Pn205	D shaft torque regulator proportional gain	5~2000	100	%	All
Pn206	D shaft torque regulator integral time constant	5~2000	100	%	All

▲ Space vector modulation, D shaft torque regulator proportional gain and integral time constant.

number	name	value range	the default value	unit	apply
Pn207	Speed feedback adjustment coefficient	1~3000	100		T

▲ When the torque control, the motor speed in a limited speed range, interventional speed feedback, to reduce the actual torque, so that the speed to limit within the scope of regression. Parameter Settings is smaller, the greater the amount of feedback, the faster the adjustment, the smaller amount of speeding, but is too small will fuel motor shaking; Parameter is set too large, adjust the slower, may have been speed, less than the speed limit. Actual speed will be slightly higher than the limit speed value.



number	name	value range	the default value	unit	apply
Pn208	track torque instruction judgment error range 1	0~300	5	%	T
Pn209	track torque instruction judgment error range 2	0~300	2	%	T

▲ To make SigOut effective TCMDreach signal output port, must meet the following conditions:

Condition 1: PC set torque instruction must be

within the error range of 1. Example: input torque command 80%, Pn208 set to 5%, internal drive of input torque instruction in deceleration operation, when calculating the output torque of the instructions within the scope of 75% ~ 85%, condition 1 is satisfied.

Condition 2: detect the actual motor torque and the difference between the input torque of the instructions in the judgment error range within 2.

### 4.3.5 Extension control parameters

## 4.4 Port functions,

### 4.4.1 SigIn Sign port function explanation

number	symbol	function	Functional specifications
0	NULL	No function specified	Drive the input status does not produce any action.
1	Son	servo enable	<p>OFF The driver is not enabled, the motor without power</p> <p>ON Drive enabled, the motor power</p> <p>Note: Pn003 parameters or Son state decision.</p>
2	AlarmReset	The alarm reset	Alarm, and when the alarm can be clear, the input signal (OFF to ON), the delay to clear the alarm.
3	CCWL	Forward driving ban	<p>OFF: Motor forward is prohibited</p> <p>ON Allow the motor forward</p> <p>Note 1: if you want to use forward driving ban, first set Pn006 parameters, enabled, and designated to a specific to the input port. By default, do not use this feature.</p> <p>Note 2: the normal operation of the motor, CCWL must in a normally closed contact state (ON)</p> <p>Note 3: the origin, this function is invalid.</p>
4	CWL	Reverse driving ban	<p>OFF: Prohibit motor reversal</p> <p>ON Allow the motor reversal</p>
5	TCCW	External forward	OFF: CCW direction torque Pn010 parameters without limit

		torque limit	<p>ON: The CCW Direction torque Pn010 parameters restrictions</p> <p>Note: whether TCCW efficient or effective, CCW direction torque is also restricted by Pn008 parameters.</p>																																				
6	TCW	Around outside the torque limit	<p>OFF: The CW direction torque Pn011 parameters without limit</p> <p>ON: The CW direction torque Pn011 parameter restrictions</p> <p>Note: whether TCW efficient or effective, the CW direction torque is also restricted by Pn009 parameters.</p>																																				
7	EMG	Emergency stop	<p>OFF: Ban drive motor drive, to cut off the motor current</p> <p>ON: Allow normal drive motor drive</p>																																				
8	Zero Lock	Zero speed clamp	<p>Speed control:</p> <p>OFF: Don't lock the motor shaft</p> <p>ON : Lock the motor shaft</p>																																				
9	SP1	Internal speed command option 1	When a drive control mode in speed control mode, the speed reference source by Sign SP1, SP2, SP3 decision:																																				
10	SP2	Internal speed command option 2	<table border="1"> <thead> <tr> <th>SP3</th> <th>SP2</th> <th>SP1</th> <th>Speed instruction</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>internal speed 1 / External analog External analog</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> </tbody> </table> <p>Note: 0 means OFF, 1 means ON.</p> <p>Note 2: if the Sign port is not specified SP3, SP2,</p>	SP3	SP2	SP1	Speed instruction	0	0	0	internal speed 1 / External analog External analog	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
SP3	SP2	SP1		Speed instruction																																			
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1	0	0	internal speed 5																																				
1	0	1	internal speed 6																																				
1	1	0	internal speed 7																																				
1	1	1	internal speed 8																																				
11	SP3	Internal speed command option 1																																					

			SP1 function, is OFF by default.															
12	TR1	The internal torque command option 1	Select the internal torque control mode, the use of TR1, TR2 combination, can choose 4 kinds of torque															
13	TR2	The internal torque command	<p>command.</p> <table border="1"> <thead> <tr> <th>TR2</th> <th>TR1</th> <th>Torque command</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>The external torque 1 / internal analog torque command</td> </tr> <tr> <td>0</td> <td>1</td> <td>The internal torque 2</td> </tr> <tr> <td>1</td> <td>0</td> <td>The internal torque 3</td> </tr> <tr> <td>1</td> <td>1</td> <td>The internal torque 4</td> </tr> </tbody> </table> <p>Note:0 means OFF,1means ON. Note 2: if the SigIn port doesn't specify TR2, TR1 functions, is OFF by default.</p>	TR2	TR1	Torque command	0	0	The external torque 1 / internal analog torque command	0	1	The internal torque 2	1	0	The internal torque 3	1	1	The internal torque 4
TR2	TR1	Torque command																
0	0	The external torque 1 / internal analog torque command																
0	1	The internal torque 2																
1	0	The internal torque 3																
1	1	The internal torque 4																
14	Cmode	Control mode switch	Parameter Pn002 for 3, 4, 5, control mode can be switched.															
15	Cgain	Gain switch	<p>When the parameter Pn045 is 2, through Cgain switch gain combination:</p> <p>OFF The first gain ON: The second gain</p>															
16	Gn1	Electronic gear molecular option 1	By Gn1, Gn2 combination, electronic gear molecules 1 ~ 4															
17	Gn2	Electronic gear molecular option 2	<table border="1"> <thead> <tr> <th>Gn2</th> <th>Gn1</th> <th>N Electronic gear than N</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td>OFF</td> <td>the 1 molecular</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>the 2 molecular</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>the 3 molecular</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>the 4 molecular</td> </tr> </tbody> </table>	Gn2	Gn1	N Electronic gear than N	OFF	OFF	the 1 molecular	OFF	ON	the 2 molecular	ON	OFF	the 3 molecular	ON	ON	the 4 molecular
Gn2	Gn1	N Electronic gear than N																
OFF	OFF	the 1 molecular																
OFF	ON	the 2 molecular																
ON	OFF	the 3 molecular																
ON	ON	the 4 molecular																
18	CINV	Instructions in reverse	<p>The speed or torque control mode, take the speed or torque of the instruction.</p> <p>OFF: The normal order ON: Instructions in reverse</p>															
19	Pclear		Clear position deviation value of the counter, clear way by Pn108															



		Position deviation to clear	parameters: <table border="1" style="margin-left: 20px;"> <tr> <td>Pn108</td> <td>way</td> </tr> <tr> <td>0</td> <td>During the Pclear level ON</td> </tr> <tr> <td>1</td> <td>Pclear rise along time (from OFF to ON)</td> </tr> </table>	Pn108	way	0	During the Pclear level ON	1	Pclear rise along time (from OFF to ON)
Pn108	way								
0	During the Pclear level ON								
1	Pclear rise along time (from OFF to ON)								
20	INH	Pulse input is prohibited	OFF: Pulse allows input instructions ON : Input instruction pulse have been banned, ignored						
21	PC	Proportional control	OFF: Speed loop PI control ON : Speed loop P control						
22	GOH	The	See the appendix F						
23	REF	The origin return reference point							
24	Pos1	Pos1 internal location choice	See the appendix G						
25	Pos2	Pos2 internal location choice							
26	ptrigger	Trigger internal position command							
27	pstop	Suspend internal position command							

#### 4.4.2 SigOut SigOut port function explanation

number	symbol	function	Functional specifications
0	null	No function specified	
1	Alarm	Alarm detection	OFF: alarm ON: no alarm

2	Ready	servo is ready	OFF: There are alarm or malfunction ON: No alarm and fault
3	Emg	Emergency stop checked out	OFF Not in a state of emergency stop ON : In a state of emergency stop
4	Preach	Positioning to complete	Position control mode OFF: Pn104 position deviation is greater than the parameter set value ON: The value of position deviation less than or equal to Pn104 parameters setting
5	Sreach	Speed to reach	OFF: Speed is less than Pn021 set value ON: Speed is greater than or equal to Pn021 set value
6	Treach	reach the predetermined torque	OFF: Torque is less than Pn024 set value ON: The value of torque is greater than or equal to Pn024 set
7	Zero Speed	zero speed	OFF: Faster than Pn027 set value ON: Speed is less than or equal to Pn027 set value
8	Run	Servo motor current	OFF: The motor has no electricity ON: motor current
9	BRK	Electromagnetic brake	OFF: Electromagnetic brake ON : Electromagnetic brake release
10	HOME	The origin return to complete	See the appendix F
11	Pnear	Located close to	in a position control OFF: Pn106 position deviation is greater than the parameter

			<p>set value</p> <p>ON: The value of position deviation less than or equal to Pn106 parameters setting</p>
12	TRQL	The Torque Limit	<p>OFF: The motor torque is not limited</p> <p>ON: The motor torque is limited</p> <p>When the torque command reaches Pn008 Pn009, Pn010, the parameter value, the smallest Pn011 TRQL to ON.</p>
13	SPL	The Speed Limit	<p>When the torque control</p> <p>OFF: Motor speed wasn't up to the limiting value</p> <p>ON: Motor speed has reached the limit</p> <p>Look Pn198 Pn199 instructions</p>
14	TCMDreach	Look Pn198 Pn199 instructions	<p>In torque control:</p> <p>OFF Motor torque did not reach the upper machine set torque instruction value</p> <p>ON The setting of motor torque reaches the upper machine set torque instruction value</p> <p>See Pn208, Pn209 instructions.</p>

## Chapter 5 monitoring parameters and operation

### 5.1 Monitor panel operation

As shown in the third chapter "monitoring mode operation"

## 5.2 Monitor the parameter list

number	instruction
dn-00	Monitor display options (the default for motor speed), and by setting the Pn079 parameter, make the dn - 00 show different monitoring status.
dn-01	Speed instruction (r/min)
dn-02	The average torque (%)
dn-03	Position deviation value (9999 ~ 9999) (unit: a)
dn-04	The ac power voltage (V)
dn-05	The maximum instantaneous torque (%)
dn-06	Input pulse frequency (in KHZ)
dn-07	Heat sink temperature (°C)
dn-08	The current motor speed (r/min)
dn-09	Effective input command pulse accumulative total value low (9999 ~ 9999) (unit: a)
dn-10	Effective input command pulse accumulative total value high (5000 ~ 5000) (unit: m) (pulse accumulative total value high more than + 5000, the high position 0, low today, to count)
dn-11	Effective feedback position control, the encoder pulse accumulative total value is low (9999 ~ 9999) (unit: a)
dn-12	Effective feedback position control, the encoder pulse accumulative total value high (5000 ~ 5000) (unit: m) (feedback pulse accumulative total value more than + 5000 high, high position 0, low today, to count)
dn-13	Regenerative braking load factor
dn-14	Signal input port state, from left to right in turn is SigIn1 ~ SigIn4 (1: high level; 0: low level)
dn-15	Output port status signal, from left to right in turn is SigOut1 ~ SigOut4 (1: high level; 0: low level)
dn-16	Analog torque command voltage (V)
dn-17	Simulation speed reference voltage (V)
dn-18	Output function status register

dn-19	After power on the servo, motor feedback pulse accumulative total value low (9999 ~ 9999) (unit: a)
dn-20	Electric servo, motor feedback pulse accumulative total value high (5000 ~ 5000) (unit: m) (feedback pulse accumulative total value more than + 5000 high, high position 0, low today, to count)
dn-21	The drive software version
dn-22	Encoder UWW signals from left to right in order for the sale of state level (1: high level; 0: low level)
dn-23	Rotor absolute position

Note: Dn - 18 output function status register SigOut port state of logic, namely each Bit position shown in the table below:

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

Function for Bit is 0, said ON state, 1 is the OFF state.

## Chapter 6 alarm and processing

### 6.1 Alarm clearance operations

As shown in the third chapter of the auxiliary model operation "police clearance operation"

### 6.2 Alarm content and countermeasure

Alarm display	Clear way	Abnormal alarm instructions	Elimination method
AL-01	power on	The memory chip memory contents are	To initialize the parameters, and observation. Internal

		destroyed or damaged	chip is damaged, replace the servo amplifier.
AL-02	reset	In the case of lack of low-pressure warning, dc bus voltage below Pn083 alarm (200 v).	<p>1 The external power supply voltage is measured with a voltmeter is in accordance with the specifications. If conform to the specifications, can use Fn009 auxiliary mode, busbar voltage correction.</p> <p>2 Through the display panel, into monitor mode, observations show that whether the voltage is consistent with an external voltage, if the difference is too big, the internal components damaged, replace the servo amplifier.</p> <p>3 Motor start too fast, large load, which leads to the internal bus voltage is lower. If it is single phase power supply access, please use three-phase power supply connection.</p>
AL-03	power on	Internal dc bus voltage is higher than Pn084 (365 v).	<p>1 The external power supply voltage is measured with a voltmeter is in accordance with the specifications. If conform to the specifications, can use Fn009 auxiliary mode, busbar voltage correction.</p> <p>2 Through the display panel, into monitor mode, observations show that whether the voltage is consistent with an external</p>

			<p>voltage, if the difference is too big, the internal components damaged, replace the servo amplifier.</p> <p>3 In a reasonable range, appropriate reduction small load inertia or prolonged deceleration, or need additional braking resistor.</p>
AL-04	power on	Intelligent power module directly produce the report to the alarm	<p>1 Check the motor line U, V, W and encoder line is normal.</p> <p>2 Turn the power off half an hour, electricity again, if the alarm is still there, may be internal power module is damaged, please replace the servo amplifier.</p> <p>3: Speed loop and current loop pid parameter Settings.</p>
AL-05	reset	overload 1	<p>Pn014 parameters set period of time for greater than Pn012 overload capacity parameters or Pn013 set by multiples of the current.</p> <p>1 Check the motor line U, V, W and encoder line is normal.</p> <p>2: Motor high frequency, acceleration and deceleration delay when the director of the deceleration time, reduce the load inertia, or in more powerful capacity</p>

			of servo motor.
AL-06	power on	overload 2	<p>Pn015 parameter set period of time, 3 times greater than the rated load. Eliminate overload method reference 1.</p> <p>Note: some motor can only bear the 2.5 or 2 times of the rated load, are not as calculated as 3 times.</p>
AL-07	reset	Motor speed is too high	<ol style="list-style-type: none"> <li>1 Check the motor line U, V, W and encoder line is normal.</li> <li>2 Reduce the pulse frequency of input instructions, or adjust the electronic gear ratio.</li> <li>3 Improper speed loop pid parameter adjustment, readjust.</li> </ol>
AL-08	reset	Servo amplifier heat sink overheating, actual temperature has more than 70 °C	<ol style="list-style-type: none"> <li>1 Repeat overload will cause the drive overheating, please change the motor operation mode. For prolonging the life of the server, and should be used under the environment temperature of 55 °C, the recommended temperature does not exceed 40 °C.</li> <li>2: Brake average power overload.</li> </ol>
AL-09	power	The encoder abnormal	<ol style="list-style-type: none"> <li>1 Check whether the motor encoder wiring is connected to the drive.</li> <li>2 Check</li> </ol>



			<p>whether the motor encoder interface virtual welding, short circuit, or fall off, the encoder the power cord is normal connection.</p> <p>3: Check the encoder voltage (5 v + / - 5%). (encoder line is long, need to pay special attention to)</p>
AL-10	reset	Actually receives the pulse frequency is too high, more than 600 KPPS	<p>1 Electronic gear ratio (A/B) Settings. To adjust the ratio of A/B.</p> <p>2: Reduce the pulse frequency of the input command</p>
AL-11	reset	Deviation number of Location pulse more than setting number	<p>1 Check the motor line U, V, W and encoder line is normal.</p> <p>Position command smoothing time constant set is too large.</p> <p>3: Increase the position loop gain, to speed up the response speed of the machine.</p> <p>4 Using the monitor model, check to see if the motor output torque limits.</p>
AL-12	reset	Current sampling circuit may be damaged	<p>1 The instantaneous electric current too big, is beyond the range of detection.</p> <p>2: Check the motor line (U, V, W) whether loose fall off.</p> <p>3: Sampling circuit is damaged, replace the servo amplifier.</p>
AL-13	power on	The CPU internal fault	<p>1: The external interference is too large, reduce the interference.</p> <p>2: The</p>

			CPU chip is damaged, replace the servo amplifier.
AL-14	Emergency stop	Emergency stop signal is effective	See if port, setting of emergency stop function, signal contact is in a normally closed state (ON)
AL-15	Abnormal driving ban	Ccwl or.cwl to OFF state	1: Check CCWL,.cwl wiring, the signal contact is in a normally closed state (ON).  2 If do not use the driving ban function, can set pn006 parameters, to block it.
AL-16	Brake average power overload	The input voltage is too high or braking load rate above 85%	1 Using the monitoring mode to see if the input voltage is beyond the normal range  2 Reduce the start-stop frequency  3 External more powerful regenerative braking resistor (remove internal brake resistance, not parallel)  4 Increase the deceleration time  5 Renewable power resistance value and the resistance value is set correctly  6 Change a more powerful motor and drive
AL-17	Abnormal encoder signal frequency output	Set the encoder output of frequency division than not.	Resetting Pn016, Pn017 parameter values, must satisfy the DA/DB > = 1.

	Settings		
AL-18	Improper motor code sets	The current drive model does not support setting of motor model	Reference drive and motor type adapter table, resetting Pn001.

## Chapter 7 Modbus communication function

### 7.1 Modbus communication profile

This drive is RS - 232 and RS - 485 communication interface,

the user can choose a kind of communication interface and the driver. Communication method adopts the Modbus transfer agreement, can use the following two communication modes: ASCII (American Standard Code for information interchange) mode and the RTU (Remote Terminal Unit) model. Before communication, you must first set up good communication related parameters (Pn064 ~ Pn071).

#### 7.1.2 Coding meaning

ASCII mode:

Each 8-bit data consists of two ASCII characters. For example, a 78 - byte data 1 h (hexadecimal notation), expressed in ASCII, contains the '7' ASCII (37 h) and "8" ASCII (38 h).

The Numbers 0 to 9 and letters A through F ASCII, the following table:

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

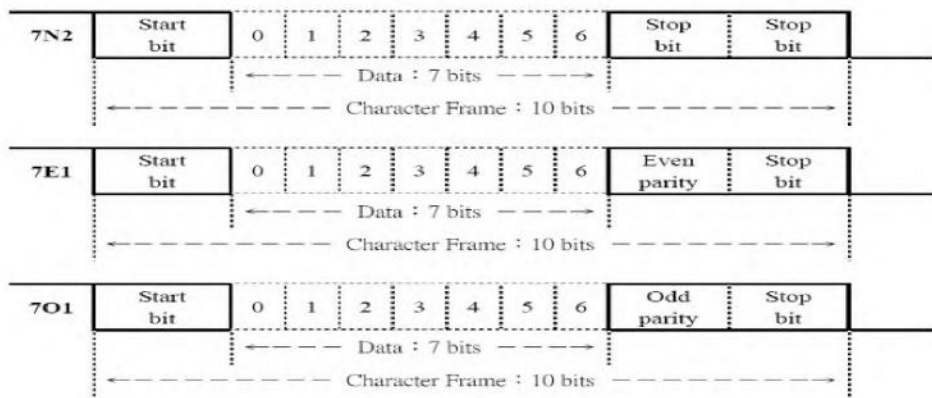
to the ASCII								
--------------	--	--	--	--	--	--	--	--

RTU mode:

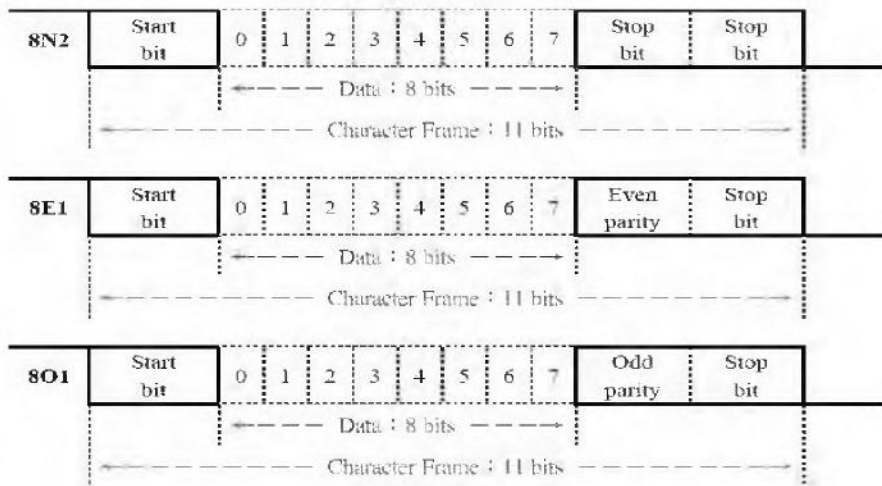
Each 4 - bit 8-bit data by two hexadecimal data, namely the general number of hexadecimal. For example, decimal in 1 120 - byte RTU data representation for 78 H.

### 7.1.3 The data structure

10 bit character mode (for 7 bit data)



11 bit character mode (for 8 bit data)



## 7.2 Communication protocol structure

ASCII mode

name	meaning	instruction
Start	Communication began	The starting character ':' (ASCII: 3 ah)
Address	The communication address	Address, that is, drive site number. For example: a drive site # 32, hexadecimal for 20 h, Address = '2', '0' or '2' = 32 h, '0' = 30 h
CMD	order	1 byte contains two ASCII. Commonly used commands: 3 h (read registers), 6 h ((reading a single register), 8 h (diagnostic function), 10 h (write multiple register)
DATA(n-1)	The data content	N = 2 N word bytes = 4 N ASCII (N <= 8)
.....		
DATA(0)		
LRC	Check code	1 byte contains two ASCII
End 1	The end of the code 1	0 dh, i.e., CR
End 0	The end of the code 0	0 ah, that is, LF

RTU mode

name	meaning	instruction
Start	Communication began	The rest time to at least 3.5 bytes transmission time
Address	The communication address	

		Address, that is, drive site number. For example: a drive site # 32, hexadecimal for 20 h, Address = 20h
CMD	command	1 byte. Commonly used commands: 3 h (read registers), 6 h ((reading a single register), 8 h (diagnostic function), 10 h (write multiple register)
DATA(n-1)	data content	Word N = 2 N bytes (N <= 9)
.....		
DATA(0)		
CRC	Check code	1 byte
End 1	The end	The rest time to at least 3.5 bytes transmission time

### 7.3 Commonly used command code

#### 7.3.1 Reading a multiple register

03H Reading a multiple register

Instructions: read the N word, N values for 1 ~ 8 scope

Example: from the site of 01 h drive read starting address 0013 h 2 words.

#### 1. ASCII mode

PC ->drive

start	'.'
Address	'0'

Response -> PC (OK)

start	'.'
Address	'0'

Response -> PC (Error)

start	'.'
Address	'0'

		'1'
cmd		'0'
		'3'
Data source address	high bit	'0'
		'0'
	low bit	'1'
		'3'
Read the register number		'0'
		'0'
		'0'
		'2'
LRC		'E'
		'7'
END1(CR)		0DH
END0(LF)		0AH

		'1'
cmd		'0'
		'3'
Data bytes		'0'
		'4'
Address 0013 h content	high bit	'0'
		'0'
	low bit	'3'
		'2'
Address 0014 h content	high bit	'0'
		'0'
	low bit	'0'
		'A'
LRC		'B'
		'C'
END1(CR)		0DH
END0(LF)		0AH

		'1'
cmd		'8'
		'3'
Abnormal code		'0'
		'2'
LRC		'7'
		'A'
END1(CR)		0DH
END0(LF)		0AH

## 2. RTU Mode

PC -> drive

Address		01H
CMD		03H
Data source address	high bit	00H
	low bit	13H

Response -> PC (OK)

Address		01H
CMD		03H
Data bytes		04H
The	high bit	00H

Response -> PC (Error)

Address		01H
CMD		83H
Abnormal code		02H
CRC low bit		C0H

Read the register number	00H
	02H
CRC low bit	35H
CRC high bit	CEH

content of the 0013 h address	low bit	32H
The content of the 0014 h address	high bit	00H
	low bit	0AH
CRC bit	low	DBH
CRC bit	high	FBH

CRC high bit	F1H
--------------	-----

### 7.3.2 Write a single register

06H Write a single register

Description: write a word to the register.

For example: drive station number of 01, write data initial address is 0013 h, write data, 100 (64 h).

#### 1. ASCII MODE

PC -> drive

Response -> PC (OK)

Response -> PC (Error)

start	‘.’	
Address	‘0’	
	‘1’	
cmd	‘0’	
	‘6’	
Data source address	high bit	‘0’
		‘0’
	low	‘1’
		‘3’

start	‘.’	
Address	‘0’	
	‘1’	
cmd	‘0’	
	‘6’	
Data source address	high bit	‘0’
		‘0’
	low	‘1’
		‘3’

start	‘.’
Address	‘0’
	‘1’
cmd	‘8’
	‘6’
Abnormal code	‘0’
	‘3’
LRC	‘7’
	‘6’



	bit	
The data content (word format)		'0'
		'0'
		'6'
		'4'
LRC		'8'
		'2'
END1(CR)		0DH
END0(LF)		0AH

	bit	
The data content (word format)		'0'
		'0'
		'6'
		'4'
LRC		'8'
		'2'
END1(CR)		0DH
END0(LF)		0AH

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

## 2. RTU MODE

PC -> drive

Address		01H
CMD		06H
Data source address	high bit	00H
	low bit	13H
The data content (word format)		00H
		64H
CRC bit	low	79H
CRC bit	high	E4H

Response -> PC  
(OK)

Address		01H
CMD		06H
Data source address	high bit	00H
	low bit	13H
The data content (word format)	F4H	00H
	48H	64H
CRC bit	low bit	79H
CRC bit	high bit	E4H

Response -> PC  
(Error)

Address	01H
CMD	86H
Abnormal code	03H
CRC low bit	02H
CRC high bit	61H

### 7.3.3 diagnosis

08H: 诊断功能 Diagnostic function

说明: 使用子功能码 0000H, 检查在 Master 和 Slaver 之间的传输信号。数据内容可为任意数。Note: use 0000 h subfunction code, check the signal transmission between the Master and Slaver. The data content can be any number.

例如: 对站点为 01H 的驱动器使用诊断功能。For example: the site of 01 h drive using diagnostic function

**1. ASCII 模式**

上位机->驱动器 PC -> drive		回应->上位机 Response -> PC (OK)		回应->上位机 Response -> PC (Error)			
start		start		start			
Address		Address		Address			
cmd		cmd		cmd			
子功能 码 Subroutine code	高位 high bit	子功能 码 Subroutine code	高位 high bit	异常码 Abnormal code			
	低位 low bit		低位 low bit				
	数据内容 (word 格式) The data content (word format)		数据内 容(word 格式) The data content (word format)		LRC		
LRC		LRC		END1(CR)			
				END0(LF)			
END1(CR)		END1(CR)					
END0(LF)		END0(LF)					

**2. RTU 模式 RTU mode**

上位机->驱动器 PC ->  
drive

Address		01H
CMD		08H
子功能码 Subroutine code	高位 high bit	00H
	低位 low bit	00H
数据内容 (word 格式) The data content (word format)	高位 high bit	86H
	低位 low bit	31H
CRC 低位 low bit		43H
CRC 高位 high bit		BFH

回应->上位机  
Response -> PC  
(OK)

Address		01H
CMD		08H
子功能码 Subroutine code	高位 high bit	00H
	低位 low bit	00H
数据内容 (word 格式) The data content (word format)	高位 high bit	86H
	低位 low bit	31H
CRC 低位 low bit		43H
CRC 高位 high bit		BFH

回应->上位机  
Response -> PC  
(Error)

Address		01H
CMD		88H
异常码 Abnormal code		03H
CRC 低位 low bit		06H
CRC 高位 high bit		01H

### 7.3.4 写多个寄存器 Write multiple register

10H: 写多个寄存器 Write multiple register

说明: 将 N 个字写到连续寄存器中, N 最大为 8 (08H)。Note: write the N word to register in a row, the N maximum 8 h (08).

例如: 将 100 (0064H)、300 (012CH) 写到局号为 01 伺服驱动器的起始地址 0013H 的连续两个寄存器中。For example: 100 (0064 h), 300 (012 ch) writes JuHao for 01 servo drives the starting address of 0013 h two consecutive registers.

#### 1. ASCII 模式 ASCII MODE

上位机->驱动器  
PC -> drive

start		‘.’
Address		‘0’
		‘1’
cmd		‘1’
		‘0’
数据起始地址 Data source address	高位 high bit	‘0’
	低位 low bit	‘0’
		‘1’
	‘3’	
写寄存器个数 Write the register number		‘0’
		‘0’
		‘0’
		‘2’
数据字节数 Data bytes		‘0’
		‘4’
写数据到 0013H Write data to the 0013 h	高位 high bit	‘0’
	低位 low bit	‘0’
		‘6’
	‘4’	

回应->上位机 Response  
-> PC (OK)

start		‘.’
Address		‘0’
		‘1’
cmd		‘1’
		‘0’
数据起始地址 Data source address	高位 high bit	‘0’
	低位 low bit	‘0’
		‘1’
	‘3’	
写寄存器个数 Write the register number		高位 high bit
		‘0’
		‘0’
		‘2’
LRC		‘4’
		‘1’
END1(CR)		0DH
END0(LF)		0AH

回应->上位机 Response  
-> PC (Error)

start		‘.’
Address		‘0’
		‘1’
cmd		‘9’
		‘0’
异常码 Abnormal code		‘0’
		‘3’
LRC		‘6’
		‘C’
END1(CR)		0DH
END0(LF)		0AH

写数据到 0014H Write data to the 0014 h	高位 high bit	'0'
		'1'
	低位 low bit	'2'
		'C'
LRC		'4'
		'5'
END1(CR)		0DH
END0(LF)		0AH

## 2. RTU 模式

上位机->驱动器 PC ->  
drive

Address		01H
CMD		10H
数据起始地址 Data source address	高位 high bit	00H
	低位 low bit	13H
写寄存器个数 Write the register number	高位 high bit	00H
	低位 low bit	02H
数据字节数		04H

回应->上位机 Response  
-> PC (OK)

Address		01H
CMD		10H
数据起始地址 Data source address	高位 high bit	00H
	低位 low bit	13H
写寄存器个数 Write the register number	高位 high bit	00H
	低位 low bit	02H

回应->上位机  
Response -> PC  
(Error)

Address		01H
CMD		90H
异常码 Abnormal code		03H
CRC 低位 low bit		0CH
CRC 高位 high bit		01H

Data bytes		
写数据到 0013H Write data to the 0013h	高位 high bit	00H
	低位 low bit	64H
写数据到 0014H Write data to the 0014h	高位 high bit	01H
	低位 low bit	2CH
CRC 低位 low bit		F3H

CRC 低位 low bit	B0H
CRC 高位 high bit	0DH

位有符号整数。A signed integer.

注 2：写单个寄存器，上位机需用 5.5ms 左右时间，以等待驱动器完成内部数据存储器的烧写；同理，写 N 个寄存器（N<=8），则上位机需要 5.5ms\*N 等待时间，才能再发送写命令。 Note 2: write a single register, PC must be about 5.5 ms, waiting for the driver to complete the internal data storage of burning; By the same token, the register write N (N < = 8), the upper machine needs 5.5 ms \* N waiting time, to send the write command.

注 3：读取 Dn-13 参数时，实际电压值=读取值/100。 Note 3: read the Dn - 13 parameters, the actual voltage value = value read / 100.

### 7.3.5 校验码计算 Check code to calculate

#### 1. LRC 校验 LRC England check

ASCII 模式采用 LRC (Longitudinal Redundancy Check) 校验码。LRC 校验是计算 Address、CMD、起始数据地址及数据内容之总和，将总和结果以 256 为单位，取余数 (若总和结果为 150H，则只取 50H) 后，再计算其补码，最后得到的结果为 LRC 校验码。ASCII mode using LRC England (Longitudinal Redundancy Check) Check code. LRC England calibration is to calculate the Address, CMD, initial data Address and the sum total of the data content will be combined results in 256, modulo (if the sum of the results for 150 h, then only take 50 h), to calculate its complement, the final results for LRC England check code.

例：从站点 01 H 伺服驱动器的 0013 地址读取 2 个字 (word)。 Example: 01 H servo drive from site 0013 address read 2 word (word)

start		'.
Address		'0'
		'1'
cmd		'0'
		'3'
数据起始地址 Data source address	高位 high bit	'0'
		'0'
	低位 low bit	'1'
		'3'
读寄存器个数 Read the register number		'0'
		'0'
		'0'
		'2'
LRC		'E'
		'7'
END1(CR)		0DH
END0(LF)		0AH

从 Address 的数据加至最后一个数据: From the Address data add to the last data:

01 H +03H+00H+13H+00H+02H=19H,因 19H 的补码为 E7H, 所以 LRC 为 'E', '7' 01 H + 3 H + 00 00 H + 13 H + H + 02 H = 19 H, for 19 H complement E7H, so LRC England as the 'E', '7'

## 2. CRC 校验 CRC check

RTU 模式采用 CRC (Cyclical Redundancy Check) 校验码。循环冗余校验 (CRC) 域为两个字节, 包含一个二进制 16 位值。附加在报文后面的 CRC 的值由发送设备计算。接收设备在接收报文时重新计算 CRC 的值, 并将计算结果于实际接收到的 CRC 值相比较。如果两个值不相等, 则为错误。RTU mode adopts CRC (Cyclical Redundancy Check) Check code. Cyclic redundancy check (CRC) domain into two bytes, containing a binary 16-bit value. Attached to the message behind the CRC value calculated by the transmitting device. When receiving device on the receiving message to recalculate the CRC value, and the calculated results compared to actually receives the CRC value. If the two values are not equal, is wrong.

CRC 的计算, 开始对一个 16 位寄存器预装全 1。然后将报文中的连续的 8 位子节对其进行后续的计算。只有字符中的 8 个数据位参与生成 CRC 的运算, 起始位, 停止位和校验位不参与 CRC 计算。CRC calculation, to a 16-bit registers with full 1. Then put the message in the continuous section 8 of the seats on the subsequent calculations. Only the characters of the eight data bits participate in the operation of generating CRC, start bit, stop bits and parity bit CRC calculation will not be involved.

生成 CRC 的过程为: To generate CRC process as follows:

1. The a 16-bit registers into hexadecimal FFFF. (1) all will be referred to as the CRC register.
2. The first 8 bytes of a message with a 16-bit CRC register low byte exclusive or, result in CRC register.
- 3.The CRC register moves to the right one to the LSB (direction), the MSB filling zero. Extraction and detection of LSB.
4. (if the LSB of 0) : repeat step 3 (another shift).  
(if the LSB to 1) : the CRC register exclusive or polynomial value 0 xa001 (1010, 0000, 0000, 0001).
- 5.Repeat steps 3 and 4 until complete displacement of 8 times. As after this action, will complete the full operation of eight bytes.
6. For the next byte of message repeat steps 2 to 5, this operation until all message being processed.
7. CRC CRC register the final content for CRC value.
8. When the CRC value is placed on a message, high and low byte must exchange.  
Byte is sent first, and then the high byte

For example: from the site of 01 H drive reads two words (word), reading the starting address of 0200 H address. The last of the data from the Address to calculate the CRC register at the end of the content is 0704 H, is the instruction format as shown below, note that the front of the 04 H in H.

Address		01H
CMD		03H
Data source address	high bit	02H
	low bit	00H
Data length (in terms of word)		00H
		02H
CRC low bit		04H
CRC high bit		07H

CRC generation paradigm:



The following CRC value by C language. This function requires two parameters:

```
Unsigned char * data; // data source address, used to calculate the CRC value
```

```
Unsigned char length; // data length
```

This function returns the unsigned integer type of CRC value.

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

### 7.3.6 Abnormal code

In the process of communication, may create a communication error, common error event in the following table:

Communication error event	Servo driver approach
Read/write parameters, data address is not correct;	The request for processing, and abnormal return an error code
Write parameters, data number	The request for processing, and abnormal return an error code

more than the maximum or not within the scope of this parameter;	
数据传输错误或者校验码(LRC、CRC、奇偶检验)错误 Data transmission errors or check code (LRC England, CRC, parity check) error	数据被丢弃, 不返回响应, 上位机应将请求作为超时状态处理 Data is discarded, not returns the response, PC should be request as state handling overtime

驱动器发送错误异常码时, 将命令功能码加上80H后一起传送给ModBus 主站系统。异常码如下表: Drive send error exception code, will command function code plus 80 h after send the ModBus master station system together. Abnormal code in the following table:

01 H	伺服驱动器不能识别请求的功能码 The function of the servo driver does not recognize the request code
02 H	请求给出的数据地址非法Data address illegal request
03 H	请求给出的数据在伺服驱动器中不允许 (读写数据个数超过驱动器允许最大值或写数据值不在参数的取值范围内) Request the data given in the servo driver does not allow (read and write data number more than drive to allow maximum or write data value is beyond the scope of parameter values)
04 H	伺服驱动器已经在开始执行请求, 但不能完成该请求。 Servo drives are beginning to execute the request, but can't complete the request.

#### 7.4 伺服参数、状态信息通信地址 The servo parameters, the state information communication address

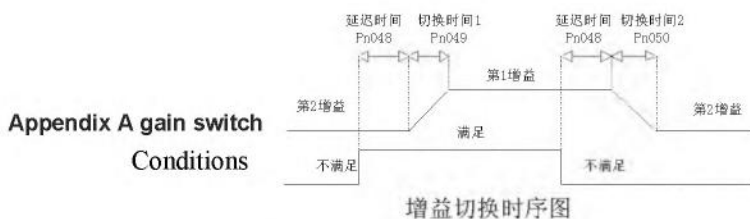
数据地址 Data address		含义 meaning	说明 instructions	操作 operation
十六进制 hexadecimal	十进制 The decimal system			
0000H~00EFH	0 ~ 239	参数设置区 Parameter setting area	对应 Pn000~Pn239 Corresponding Pn000 ~ Pn239	可读可写 Can read but write
0164H~016DH	356 ~ 365	报警记录区 Alarm recording area	在 Fn000 中可以查看, 对应 Sn--0~Sn--9 In Fn000 can view, corresponding Sn - 0 to Sn - 9	只读 read-only
0170H~0185H	368 ~ 389	数据监控区 Data monitoring area	对应 Dn000~Dn021	只读

## 附录 The appendix

### 附录 A 增益切换 Appendix A gain switch

第一增益 The first gain		第二增益 The second gain	
参数 parameter	名称 name	参数 parameter	名称 name
Pn153	速度调节器比例增益 1 The speed regulator proportional gain 1	Pn155	速度调节器比例增益 2 The speed regulator proportional gain 2
Pn154	速度调节器积分时间常数 1 Speed regulator integral time constant of 1	Pn156	速度调节器积分时间常数 2 Speed regulator integral time constant of 2
Pn192	转矩 Q 轴调节器比例增益 1Q shaft torque regulator proportional gain is 1	Pn194	转矩 Q 轴调节器比例增益 2Q shaft torque regulator proportional gain is 2
Pn193	转矩 Q 轴调节器积分时间常数 1 Q shaft torque regulator integral time constant of 1	Pn195	转矩 Q 轴调节器积分时间常数 2 Q shaft torque regulator integral time constant of 2
Pn196	转矩 Q 轴滤波时间常数 1Torque Q axis filter time constant of 1	Pn197	转矩 Q 滤波时间常数 2Torque Q axis filter time constant of 2
Pn115	位置调节器增益 1 The position controller gain 1	Pn116	位置调节器增益 2 The position controller gain 2

注：增益切换时，必须处于合适的控制模式，设置参数 Pn046 的条件合适，才能满足增益切换条件，进行切换。 Note: gain switch, must be in the right control mode, the setting parameters Pn046 conditions are right, to meet gain switching conditions, to switch.



### 附录 B 控制模式切换 Appendix B control mode switch

#### B.1 位置/速度控制模式切换 Position/speed control mode switch

使用控制切换(cmode), 可通过输入控制端口SigIn接点进行位置控制模式和速度控制模式的切换。Using the control switch (cmode), can be controlled by input port SigIn contact for position control and speed control mode switch.

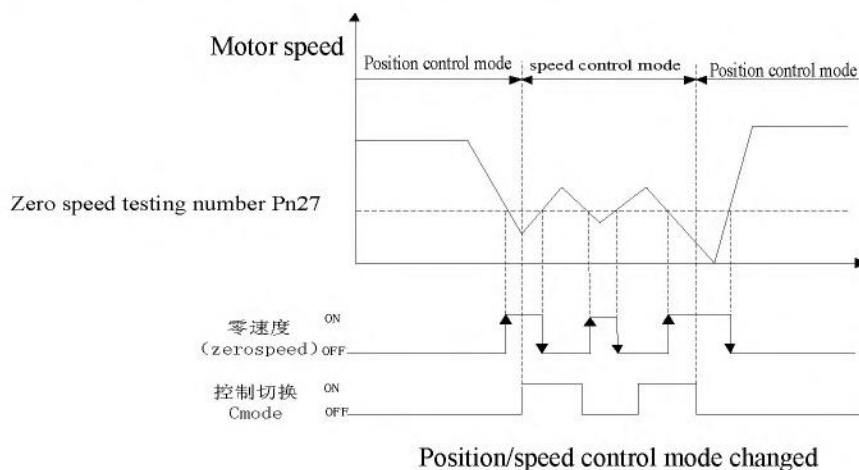
cmode和控制模式的关系如下所示。Cmode relationship with control mode is shown below.

Cmode	控制模式control mode
OFF	位置控制模式Position control mode
ON	速度控制模式Speed control mode

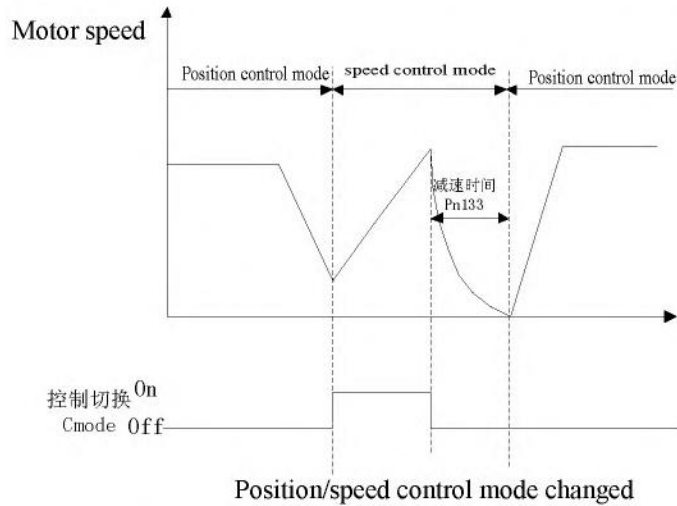
可以在零速度状态时进行控制模式的切换。但为了安全起见, 请在伺服电机停止时进行切换。从位置控制模式切换到速度控制模式时, 滞留脉冲将被清除。电机使能前, 请先确定要进入的控制模式 (cmode引脚的状态)。电机使能时, 切换方式有两种, 时序图如下所示: Can be in the state of zero speed control mode switch. But to be on the safe side, please switch with the servo motor stopped. From the position control mode switch to the speed control mode, the trapped pulse will be cleared. Before the machine can make, please make sure to enter the control mode (state) of cmode pin. Motor can make, there are two main ways to switch, sequence diagram as shown below:

▲Pn132=0:

只有零速度状态下, 切换信号发生改变, 模式切换才有效; 如果不在零速度状态下, 切换信号发生了改变, 随后信号进入零速度状态, 则不发生模式切换。Only the zero velocity condition, switching signal changes, the mode switch is valid; If not zero velocity state, the switching signal is changed, then enter into the state of zero speed signal, the mode switch does not occur.



▲Pn132=1:



## B.2 位置/转矩控制模式切换 Position/torque control mode switch

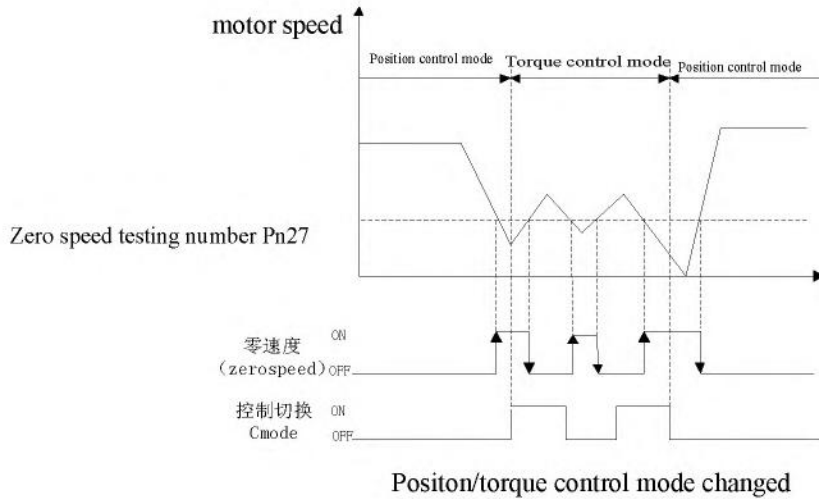
使用控制切换(cmode), 可通过输入控制端口SigIn接点进行位置控制模式和转矩控制模式的切换。cmode和控制模式的关系如下所示。Using the control switch (cmode), can be controlled by input port SigIn contact position control mode and the torque control mode switching. Cmode relationship with control mode is shown below.

Cmode	控制模式control mode
OFF	位置控制模式position control mode
ON	转矩控制模式Torque control mode

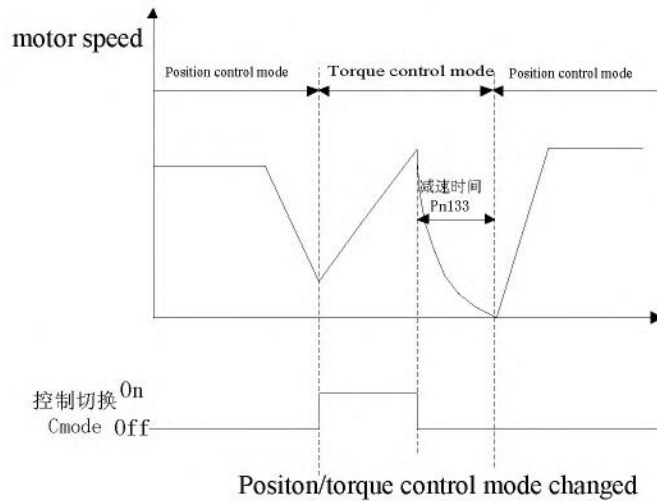
可以在零速度状态时进行控制模式的切换。但为了安全起见, 请在伺服电机停止时进行切换。从位置控制模式切换到转矩控制模式时, 滞留脉冲将被清除。电机使能时, 切换方式有两种, 时序图如下所示: Can be in the state of zero speed control mode switch. But to be on the safe side, please switch with the servo motor stopped. From the position control mode switch to the torque control mode, the trapped pulse will be cleared. Motor can make, there are two main ways to switch, sequence diagram as shown below:

### ▲Pn132=0:

只有零速度状态下, 切换信号发生改变, 模式切换才有效; 如果不在零速度状态下, 切换信号发生了改变, 随后信号进入零速度状态, 则不发生模式切换。Only the zero velocity condition, switching signal changes, the mode switch is valid; If not zero velocity state, the switching signal is changed, then enter into the state of zero speed signal, the mode switch does not occur.



▲Pn132=1:



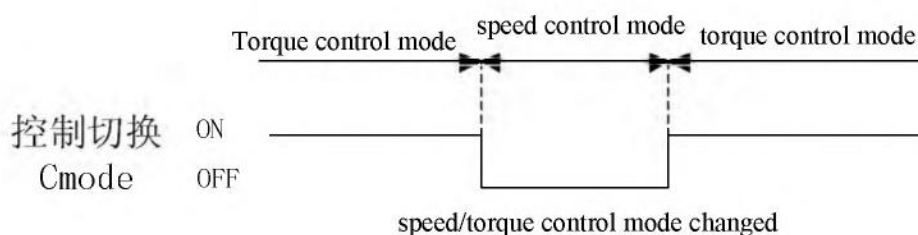
### B.3 速度/转矩控制模式切换 Speed/torque control mode switch

使用控制切换(cmode), 可通过输入控制端口SigIn接点进行速度控制模式和转矩控制模式的切换。  
Using the control switch (cmode), can be controlled by input port SigIn contact for speed control mode and the torque control mode switching.

cmode和控制模式的关系如下所示。Cmode relationship with control mode is shown below.

Cmode	控制模式control mode
OFF	速度控制模式position control mode
ON	转矩控制模式Torque control mode

不管何时都可以进行控制模式的切换，切换的时序图如下所示：Whenever can control mode switch, switching sequence diagram as shown below:



## 附录 C 伺服驱动器工作时序 Appendix C servo driver work sequence

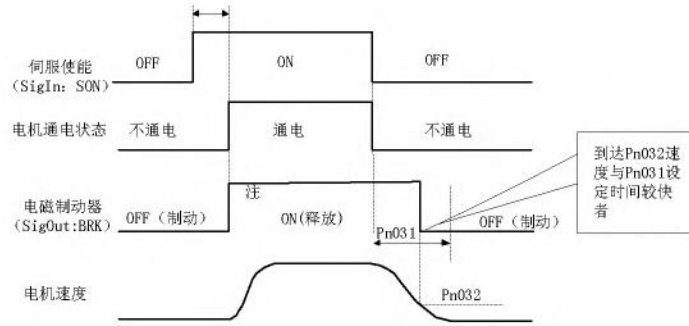
### C.1 电机静止时的 ON/OFF 动作时序 Motor resting ON/OFF action sequence



注 1: 使用电磁制动功能时, 伺服断使能方式 Pn004 必须设置为 2。Note 1: when using electromagnetic brake function, servo broken way can make Pn004 must be set to 2.

注 2: 当电机转速低于参数 Pn029 时, 电磁制动器的动作时序。Note 2: when Pn029 motor speed is lower than the argument, the electromagnetic brake action sequence.

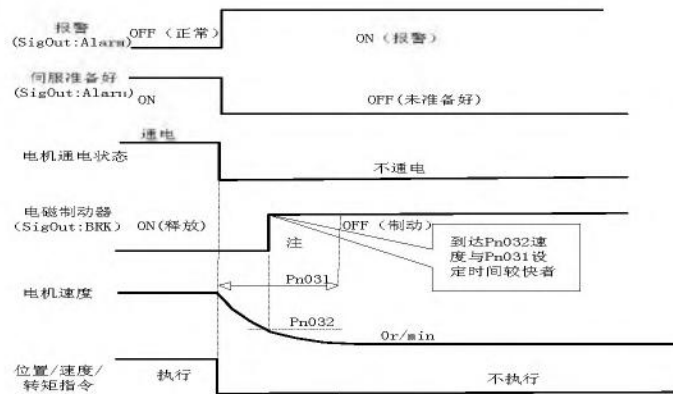
### C.2 电机运转时的 ON/OFF 动作时序 In the operation of the motor ON/OFF action sequence



注 1: 使用电磁制动功能时, 伺服断使能方式 Pn004 必须设置为 2 Note 1: when using electromagnetic brake function, servo broken way can make Pn004 must be set to 2

注 2: 当电机转速不低于参数 Pn029 设定值时, 电磁制动器的动作时序。Note 2: when the motor speed is not lower than Pn029 setting parameters, the electromagnetic brake action sequence.

### C.3 伺服 ON 时报警的时序 When the servo ON alarm sequence



注 1: 使用电磁制动功能时, 伺服断使能方式 Pn005 必须设置为 2 Note 1: when using electromagnetic brake function, servo broken way can make Pn005 must be set to 2

## 附录 D 电磁制动器 Appendix D electromagnetic brake

电磁制动器（保持制动器、失电制动器），用于锁住与电机相连的垂直或倾斜工作台，防止伺服电源失去后工作台跌落。实现这个功能，须选购带制动器的电机。制动器只能用来保持工作台，绝不能用于减速和停止机器运动。Electromagnetic brake (to keep the brakes, brake losing electricity, are connected to the motor is used to lock the vertical or inclined workbench, prevent the servo power after losing the workbench. Implement this function, you must choose and buy motor with brake. The brake can be used to keep the workbench, must not be used to slow down and stop the machine movement.



使用电磁制动器，必须设置 Pn004 参数为 2,并在 SigOut 端口指定功能。驱动器根据电机运行的转速，依照参数 Pn029 设定值，选择相应的制动时序，执行电磁制动功能。具体时序详见附录 C。Pn004 parameter must be set using the electromagnetic brake, to 2, and specify the SigOut port function. Pn029 drive according to the speed of the motor running, according to the parameters setting, choose corresponding braking time sequence, perform the function of electromagnetic brake. Please refer to the appendix C for specific timing.

## 附录 E 再生制动电阻 Appendix E regenerative braking resistor

当伺服电机运转在发电机模式时，电能会由电机流向驱动器，称为再生电力。以下使用情况，会使伺服电机运转在发电机(再生)模式：When servo motor running in generator mode, electricity will flow by motor drives, called renewable electricity. The following usage, can make the servo motor running in generator (renewable) mode:

- (1) 伺服电机在加减速运转时，由减速到停止期间。Servo motor, the deceleration is running by slowing down to stop.
- (2) 应用于垂直负载时。When applied to the vertical load.
- (3) 由负载端驱动伺服电机运转时。Driven by load operation of the servo motor.

此再生电力会由驱动器的主回路滤波电容吸收，但是再生电力过多时，滤波电容无法承受时，必须使用再生电阻来消耗多余的再生电能。当出现再生能量过大，内部制动电阻不能完全吸收，导致出现 AL-03(过压)、AL-08(过温)或 AL-16(制动平均功率过载)等报警。根据实际应用，增加加减速时间，若仍旧报警，就需要外接制动电阻，增强制动效果。外接制动电阻阻值范围 40~200 欧姆，功率 1000~50W，阻值越小，制动电流越大，所需制动电阻功率越大，制动能量越大，但阻值太小会可能造成损坏驱动器，试验方法是阻值由大到小，直到驱动器不再出现报警，同时运行时，制动电阻温度不太高即可。外接制动电阻时，拆去内部再生制动电阻。由于再生电阻在消耗再生电力时，会产生 100°C 以上高温，请务必小心，在连接再生电阻的电线请使用耐热不易燃的线材，并确认再生电阻没有碰触任何物品。The renewable electricity will be absorbed by the drive of the primary loop filter capacitor, but too much renewable electricity, filter capacitance cannot afford, regenerative resistor must be used to burn off excess renewable electricity. When there is a renewable energy is too large, the internal brake resistance cannot be fully absorbed, resulting in AL - 03 (overvoltage), AL - 08 (temperature) or AL - 16 (such as brake average power overload) call the police. According to the practical application, increase deceleration time, if still alarm, requires external braking resistance, enhance the braking effect. External braking resistance tolerance range of 40 ~ 200 ohms, 1000-50 w, the smaller the value, the braking current, the greater the power, the greater the braking resistance is required for braking energy is larger, but the value is too small may cause damage to the drive, resistance test method is from big to small, until the alarm is no longer present drives, running at the same time, the brake resistance temperature is not too high. When external braking resistor, down the internal regenerative braking resistor. Because regenerative resistor in the

consumption of renewable power, can produce high temperature above 100 ° C, please be careful, the connection of regenerative resistor wire please use of heat-resistant non-flammable cables, and confirm the regenerative resistor without touching anything.

注意：使用再生电阻时如果有上述报警产生，请切断电源，冷却半小时。由于再生晶体管发生故障，再生电阻异常发热，可能会造成火灾。请务必根据应用场合，选择相匹配的制动电阻。Note: if the alarm when using regenerative resistor, please cut off power supply, cooling and a half hours. Due to the regenerative transistor failure, abnormal regeneration resistance heating, may cause a fire. Please be sure to choose according to applications, matching the braking resistor.

## 附录 F 原点回归 Appendix F origin point

### F.1 原点回归运行步骤 F. 1 origin point operation steps

#### 1: 找参考点 Looking for a reference point

启动原点回归功能后，按原点加归第一速度寻找参考点，可使用 SigIn 输入端子 REF、CCWL 或 CWL 作为参考点，也可以 Z 脉冲作为参考点，可选择正转或反转方向寻找。After start origin regression function, looking for reference point at the origin and return to the first rate, can use SigIn input terminals REF, CCWL or cwl as a reference point, can also be Z pulse as a reference point, can choose forward or reverse direction finding.

#### 2: 找原点 find the origin

当找到参考点后，再以第二速度寻找原点，可选择继续向前或向后折返找 Z 脉冲，也可以直接以参考点作原点。When find reference point, and then to find the origin at the second speed, can choose continue to forward or backward turn-back find Z pulse, may also directly to the reference point for the origin.

原点回归执行过程中，为避免速度剧烈变化造成的机械冲击，可设置参数 Pn040、Pn041 进行加减速。找到的原点加上偏移量脉冲作为实际原点，偏移量为：

$Pn036 * 10000 + Pn037$ 。

Origin point execution process, to avoid rapid changes of mechanical impact velocity, can be set parameters for deceleration Pn040, Pn041. Find the origin and offset pulse as actual origin, the offset is:

$Pn036 * 10000 + Pn037$ 。

原点回归参考点模式(Pn034)和原点模式(Pn035)有以下组合：The origin return reference point mode (Pn034) and the origin (Pn035) has the following combination:

Pn034 \ Pn035	0	1	2	3	4	5
0	✓(A)	✓(B)	✓(A)	✓(B)	X	X
1	✓(C)	✓(D)	X	X	X	X
2	✓(E)	✓(F)	X	X	✓(G)	✓(H)

其中✓表示原点模式组合会正常执行，X表示原点模式组合不会执行。

## F.2 原点回归触发时序 The origin return to trigger sequence

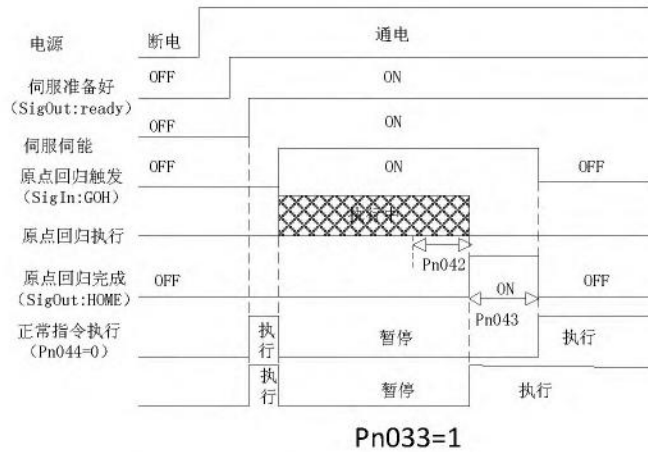
Pn033	原点回归触发方式 The origin is triggered	<p>0:关闭原点回归功能 Close the origin regression function</p> <p>1: 由 SigIn 输入的 GOH 电平触发 Triggered by the GOH SigIn input level</p> <p>2: 由 SigIn 输入的 GOH 边沿触发 GOH edge triggered by SigIn input</p> <p>3: 上电自动执行一次 Electricity automatically perform again</p>
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### 电平触发 (Pn033=1) Level trigger (Pn033 = 1)

伺服使能后，输入端子 GOH 触发原点回归执行，GOH 上边沿开始回归操作，暂停正常指令执行，下边沿结束回归操作。GOH 一直保持 ON,回归执行完后，位置偏差清零(位置控制)，输出端子 HOME 变为 ON。直到 GOH 变为 OFF,则 HOME 变为 OFF。Servo enabled, the input terminals GOH triggered the origin return to execute, GOH edge began to return to operation, the suspension of normal instruction execution, the end of the edge back to operation. GOH has kept ON, after the return to perform, position deviation reset (position control), the output terminal HOME ON. Until GOH is OFF, is HOME to OFF.

当 Pn044=0 时，原点回归完成后等待 HOME 信号 变为 OFF 后再 执行指令，等待期间电机停留在原点，不接受指令；当 Pn044=1 时，原点回归完成后立刻执指令。When Pn044 = 0, origin wait for after the completion of the HOME after the signal into a OFF again executes instructions, waiting for the motor during stay at the origin, not accept instructions; When Pn044 = 1, the origin return immediately after the completion of the instructions.

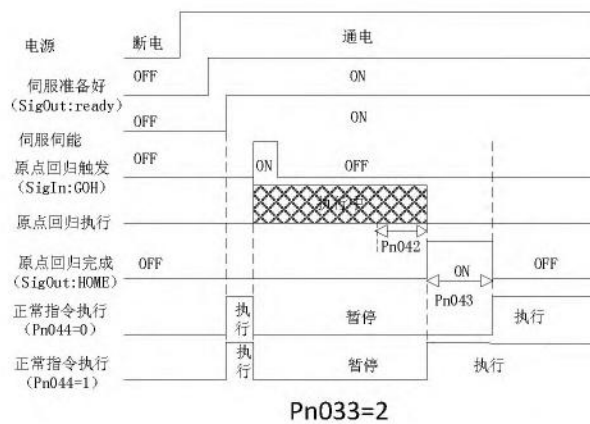
在原点回归执行中，如果取消伺服使能 SON、产生任何报警、GOH 提前变为 OFF，则原点回归功能中止且输出端子 HOME 不动作。此外，如果使能 son 有效、没有报警，回归在执行中且没有完成，即使边沿触发 (Pn033=2) 信号重复有效，则驱动器会完成当前回归操作后，再检测边沿触发信号。At the origin in the execution of regression, if cancel the servo can make SON, produce any alarm, GOH into OFF ahead of schedule, the origin of regression function suspension and output terminals HOME not action. In addition, if effective, no alarm, can make the son return in execution and there is no complete, even if the edge triggered (Pn033 = 2) repeat signals effectively, the drive will be completed the current return after operation, to detect edge trigger signal.



Pn033=1

**边沿触发 (Pn033=2) Edge triggered (Pn033 = 2)**

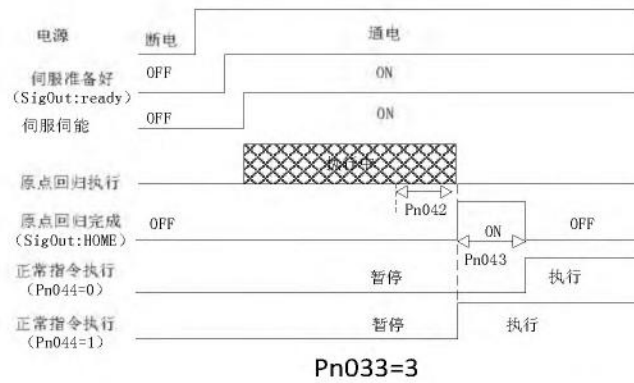
伺服使能后，输入端子 GOH 上升触发原点回归执行，并暂停正常指令执行 Servo enabled, the input terminals GOH rise triggered the origin return to perform, and suspension of normal instruction execution



Pn033=2

**上电自动执行 (Pn033=3) Electricity automatically perform (Pn033 = 3)**

此功能仅于上电后伺服初次使能有效时执行一次，以后不需要重复运行原点回归的情况。每次上电，驱动器自动执行一次原点回归操作。使用此功能可以节省一个输入端子 GOH。This function only in electric servo make effective for the first time after the execution time, later don't need to repeat the origin regression. Every time it with electricity, drive automatically perform an origin point operations. Use this feature can save one input terminal GOH.



### F.3 原点回归组合模式时序 The origin model time-series regression combination

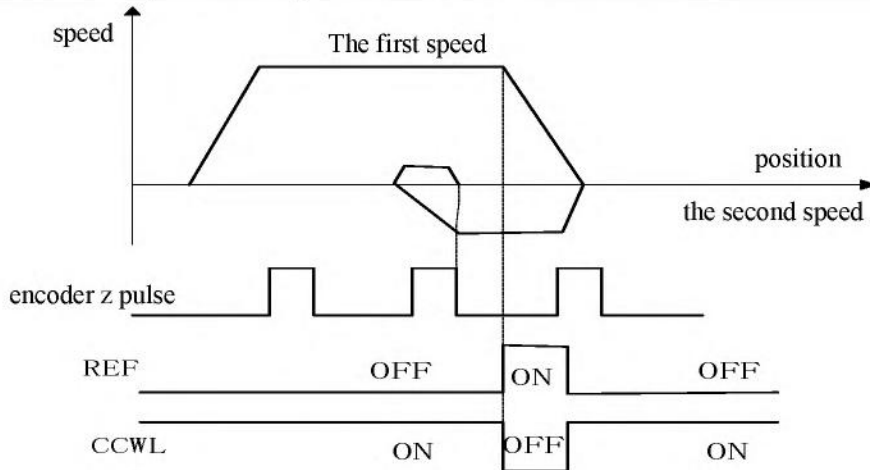
Pn034	原点回归参考点模式 The origin return reference point model	<p>0:正转找 REF(上升沿触发)作参考点 Forward looking for REF (rising along the trigger) as a reference point</p> <p>1:反转找 REF(上升沿触发)作参考点 Inversion for REF (rising along the trigger) as a reference point</p> <p>2:正转找 CCWL(下降沿触发)作参考点 Forward looking for CCWL falling edge (trigger) as a reference point</p> <p>3:反转找 CWL(下降沿触发)作参考点 Inversion to find.cwl falling edge (trigger) for reference</p> <p>4:正转找 Z 脉冲作参考点 Forward looking for Z pulse as a reference point</p> <p>5:反转找 Z 脉冲作参考点 Pulse inversion for Z as a reference point</p>	0~5	0
Pn035	原点回归原点模式 The origin back to the origin model	<p>0: 向后找 Z 脉冲作原点 Backward looking for Z pulse as the origin</p> <p>1: 向前找 Z 脉冲作原点 Forward looking for Z pulse as the origin</p> <p>2: 直接以参考点上升沿作原点 Directly with reference point rise along the origin</p>	0~2	0

注 1: 通过组合参数 Pn034 和 Pn035, 有 8 种可用的原点回归方式。Note 1: by combining Pn034 and Pn035 parameters, there are eight kinds of available ways of origin.

注 2: 在原点回归操作时, 将关闭正/反驱动禁止功能, 直至退出回归操作。Note 2: when operating at the origin regression will close/reverse driving ban function, until the exit to return to operation.

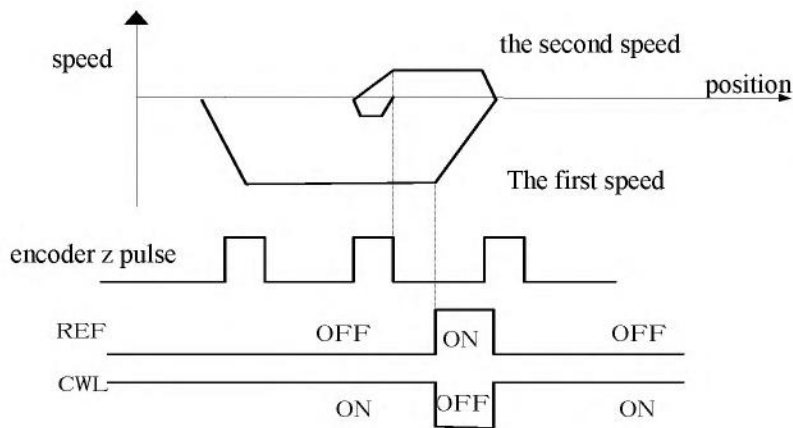
**(A)Pn034=0 或 2,Pn035=0**

参数 parameter	设定 set	说明 instruction
Pn034	0 或 2 0 or 2	原点回归启动后, 按回归第一速度正转找 REF(上升沿触发)或 CCWL(下降沿触发)作参考点 Origin starts, to return to the first speed forward looking for REF (rising along the trigger) or CCWL falling edge (trigger) as a reference point
Pn035	0	到达参考点后, 按回归第二速度向后找 Z 脉冲作原点 Arriving at reference points, the backward looking for Z pulse to return to the second speed as the origin



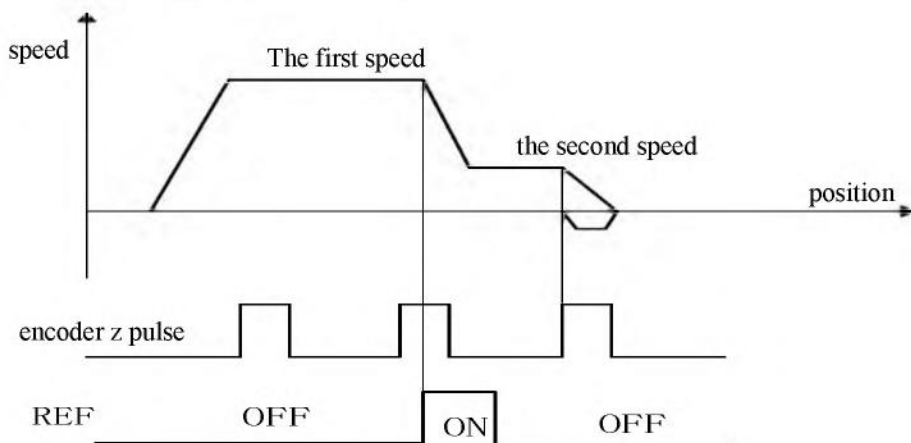
**(B) Pn034=1 或 3, Pn035=0**

参数 parameter	设定 set	说明 instruction
Pn034	1 或 3	原点回归启动后, 按回归第一速度反转找 REF (上升沿触发) 或 CWL(下降沿触发)作参考点 Origin starts, to return to the first speed inversion for REF (rising along the trigger) or.cwl falling edge (trigger) as a reference point
Pn035	0	到达参考点后, 按回归第二速度向后找 Z 脉冲作原点 Arriving at reference points, the backward looking for Z pulse to return to the second speed as the origin



**(C) Pn034=0, Pn035=1**

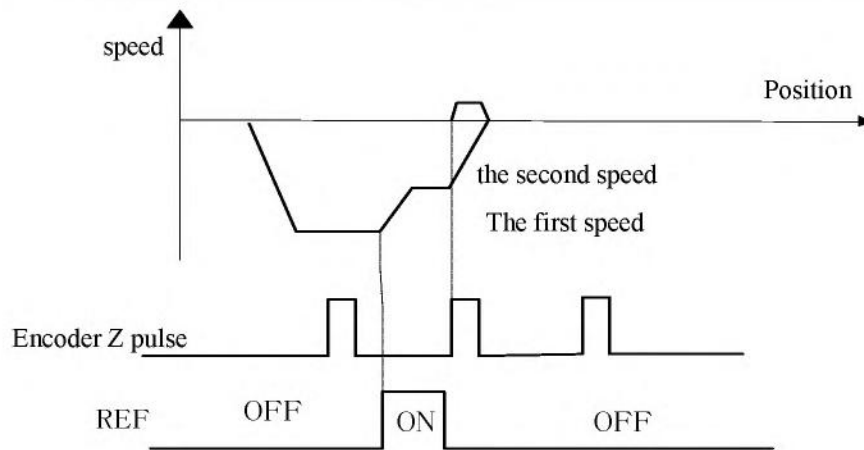
参数 parameter	设定 set	说明 instruction
Pn034	0	原点回归启动后，按回归第一速度正转找 REF(上升沿触发)作参考点 Origin starts, to return to the first speed forward looking for REF (rising along the trigger) as a reference point
Pn035	1	到达参考点后，按回归第二速度向前找 Z 脉冲作原点 Arrived at the reference point, to return to the second speed forward looking for Z pulse as the origin



**(D) Pn034=1, Pn035=1**

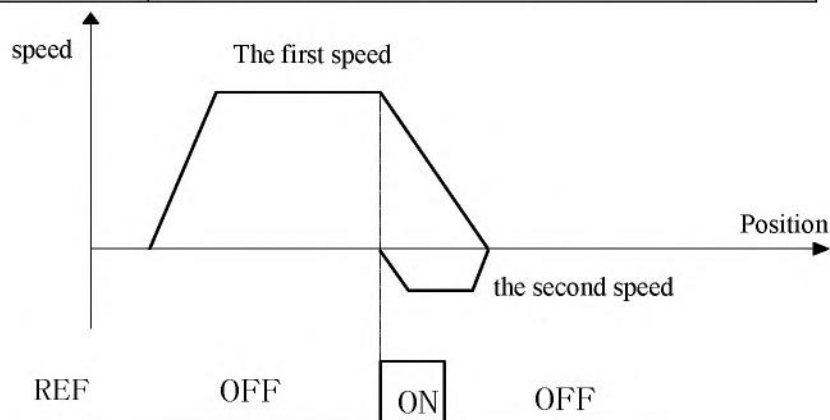
参数 parameter	设定 set	说明 instruction
Pn034	1	原点回归启动后，按回归第一速度反转找 REF(上升沿触发)作参考点 Origin starts, to return to the first speed inversion to find the REF (rising

		along the trigger) as a reference point
Pn035	1	到达参考点后, 按回归第二速度向前找 Z 脉冲作原点 Arrived at the reference point, to return to the second speed forward looking for Z pulse as the origin



**(E)Pn034=0,Pn035=2**

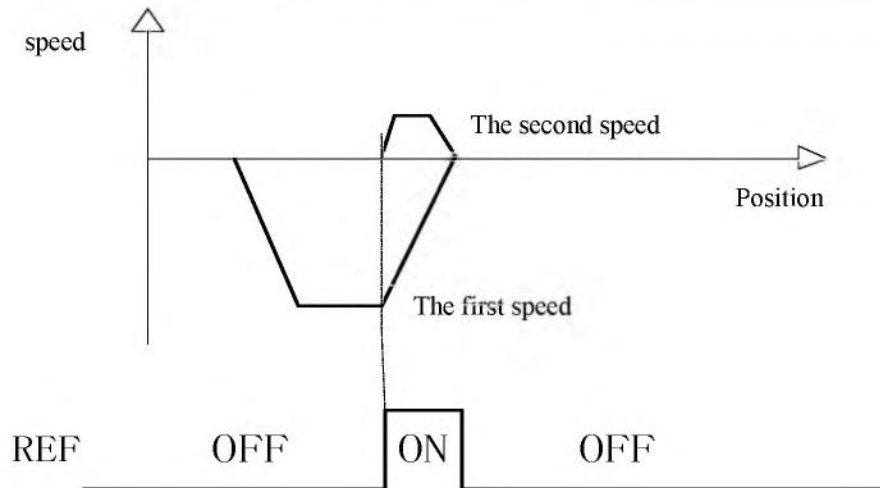
参数 parameter	设定 set	说明 instruction
Pn034	0	原点回归启动后, 按回归第一速度正转找 REF(上升沿触发)作参考点 Origin starts, to return to the first speed forward looking for REF (rising along the trigger) as a reference point
Pn035	2	到达参考点后, 直接以参考点作为原点 Arriving at reference points, the direct reference point as the origin



**(F)Pn034=1,Pn035=2**

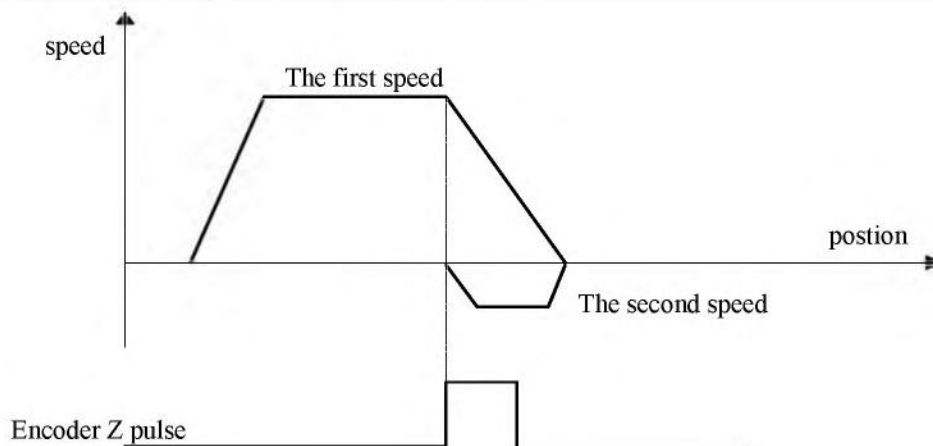


参数 parameter	设定 set	说明 instruction
Pn034	1	原点回归启动后,按回归第一速度反转找 REF(上升沿触发)作参考点 Origin starts, to return to the first speed inversion for REF (rising along the trigger) as a reference point
Pn035	2	到达参考点后,直接以参考点作为原点 Arriving at reference points, the direct reference point as the origin



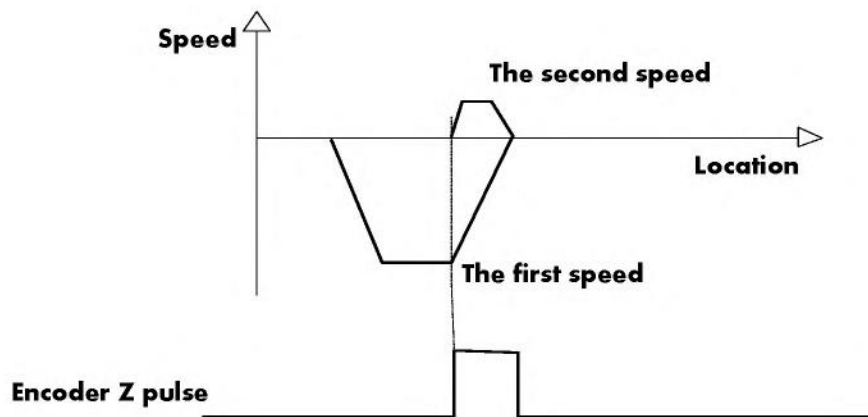
**(G)Pn034=4,Pn035=2**

参数 parameter	设定 set	说明 instruction
Pn034	4	原点回归启动后,按回归第一速度正转找 Z 脉冲作参考点 Origin starts, to return to the first speed forward looking for Z pulse as a reference point
Pn035	2	到达参考点后,直接以参考点作为原点 Arriving at reference points, the direct reference point as the origin



**(H)Pn034=5,Pn035=2**

parameter	set	instruction
Pn034	5	Origin starts, to return to the first speed pulse inversion for Z as a reference point
Pn035	2	Arriving at reference points, the direct reference point as the origin



**The appendix G internal position control**

An internal position control, need to set Pn002 = 2, Pn117 = 1, and in Pn118 ~ Pn131 set up corresponding operation parameters.

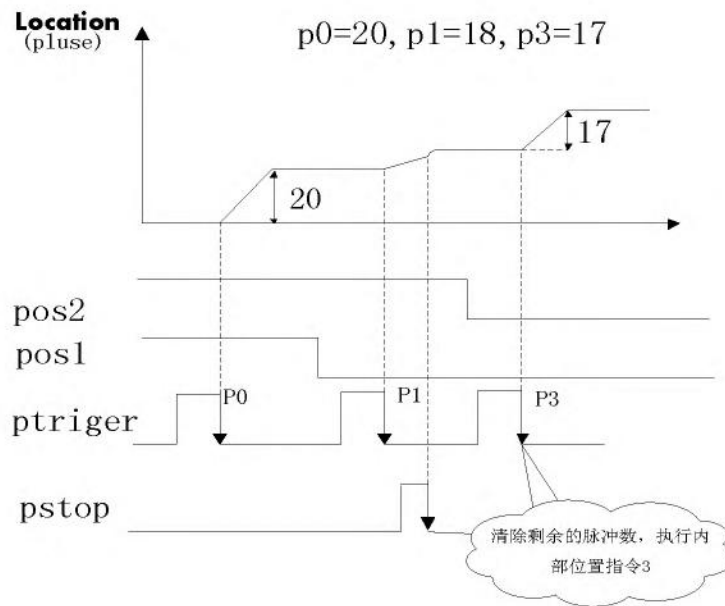
SigIn port pos1, pos2 choose internal position command N:

Pos2	Pos1	internal location instructions N
1	1	internal location instructions 0
1	0	internal location instructions 1
0	1	internal location instructions 2
0	0	internal location instructions 3

When using internal position control, make sure the input port pos1, pos2 state, namely choose corresponding internal position command, and then trigger ptrigger input signal, each ptrigger

(OFF -> ON) falling edge, the driver will read instruction N internal position, accumulate to the rest of the order the number of pulses, continue to perform the corresponding operation.

If set Pn118 = 0, want to suspend the motor running, in the process of position when the trigger input port pstop signal, motor speed to stop, and then drive automatically remove residual position instruction, when the input port ptriger fire again, the drive will be based on the current pos1, pos2 state, execute the position of the corresponding instructions, please refer to the following sequence diagram:



If set Pn118 = 1, want to pause in the process of the position the motor running, when the trigger input port pstop signal, motor speed to stop, when the input port ptriger fire again, the location of the electricity opportunities continue to walk the remaining instructions, the input port pstop trigger issued before the target location, please refer to the following sequence diagram:

