1	PUL+	2	COM24V+
3	PUL-	4	IN1
5	DIR+	6	IN2
7	DIR-	8	IN3
9	OUT1+	10	IN4
11	OUT1-	12	NC
13	OUT2+	14	BRK+
15	OUT2-	16	BRK-

RS485_TR	SW1	SW2
Null	OFF	OFF
120Ω	ON	ON

DRV Series Low Voltage Servo Driver

User Manual

Foreword

First of all, thank you for purchasing the DRV series servo driver!

DRV series servo drive products are small and medium power low voltage servo driver developed by Shenzhen Rtelligent Mechanical Electrical Technology Co., Ltd. The power range of this series of products is 50W ~ 2000W, support a variety of communication protocols: MODBUS communication protocol, CAN communication protocol, EtherCAT communication protocol. The motor with communication type absolute encoder can run quietly and smoothly, and the positioning control is more accurate. It is suitable for printed circuit board punching machines, handling machines, food processing machines, machine tools, transfer machines and other automation equipment to achieve fast and accurate position control, speed control and torque control.

This manual is a comprehensive user manual for DRV series servo drives, providing product safety information, mechanical and electrical installation instructions, commissioning application and maintenance instructions. For first time users, please read this manual carefully. If you have doubts about some functions and performance, please consult our technical support staff for assistance.

Due to the continuous improvement of servo drivers, the information provided by our company is subject to change without notice.

Manual Version Change Record

Date	Changed version	Change content
2021.08	V1.0	First edition released

Contents

Chapter 1 Safety Reminder

1.1 Safety precautions

- Cut off the power supply for more than 5 minutes before disassembling and installing the driver. Otherwise, it may cause electric shock due to residual voltage.
- Please never touch the inside of the servo driver, otherwise it may cause electric shock.
- Please insulate the connection part of the power terminal, otherwise it may cause electric shock.
- The grounding terminal of the servo driver must be grounded, otherwise it may cause electric shock.
- Do not damage or pull the cable forcefully, and do not subject the cable to excessive force, place it under heavy objects, or clamp it. Otherwise, it may cause electric shock, cause the product to stop operating or burn out.
- Do not set up, disassemble and repair unless designated personnel, otherwise it may cause electric shock or injury.
- Do not remove the cover, cables, connectors and optional accessories when the power is on, otherwise it may cause electric shock and damage the driver.
- Please follow the steps required by this manual for trial operation.
- When the servo motor is connected to the machine, if an operation error occurs, it will not only cause damage to the machine, but also sometimes cause personal accidents.
- Do not change the maximum speed value except for special purposes. If you change it accidentally, it may damage the machine or cause injury.
- When the power is turned on and for a period of time after the power is cut off, the heat sink of the servo driver, the external braking resistor, the servo motor, etc. may become hot. Please do not touch it, otherwise it may cause burns. In order to prevent your hands or components (such as cables, etc.) from contacting them negligently, please take safety measures such as installing the enclosure.
- When the servo motor is running, please never touch its rotating part, otherwise you may get injured.
- When installing on the supporting machinery and starting to run, please put the servo motor in a state where it can be stopped at any time in advance, otherwise it may be injured.
- Please install a stop device on the machine side to ensure safety.
- The brake of the servo motor with brake is not a stopping device to ensure safety. If the stop device is not installed, it may cause injury.
- If the power supply is restored after a momentary power failure occurs during operation, the machine may restart suddenly, so please do not approach the machine.
- Please take measures to ensure that personal safety will not be endangered when restarting, otherwise it may cause injury.
- Please never modify this product, otherwise it may cause injury or mechanical damage.

- Please install the servo driver, servo motor, and external braking resistor on non-combustible materials, otherwise it may cause a fire.
- Be sure to connect an electromagnetic contactor and a non-fuse circuit breaker between the power supply and the main circuit power supply of the servo driver. Otherwise, when the servo driver fails, the large current cannot be cut off, which may cause a fire.
- Please do not mix oil, grease and other flammable foreign objects and screws, metal pieces and other conductive foreign objects inside the servo driver and the servo motor.

1.2 **Precautions for confirming the arrival of products**

Confirmation Items	Description
Does the delivered product match the model of the product you ordered?	The packing box contains the machine you ordered. Please confirm it on the nameplate model of the servo motor and servo driver.
Is there any damage to the product?	Please check the positive surface to see if the product is damaged during transportation. If any omission or damage is found, please contact our company or your supplier as soon as possible.
Is the servo motor rotating smoothly?	It is normal to be able to turn gently by hand. Except for servo motors with brakes.

Chapter 2 Product Information and Installation

2.1 Driver Introduction

2.1.1 Nameplate and model description

DRV 400 C

Marking	Meaning
DRV	Rtelligent low voltage servo driver

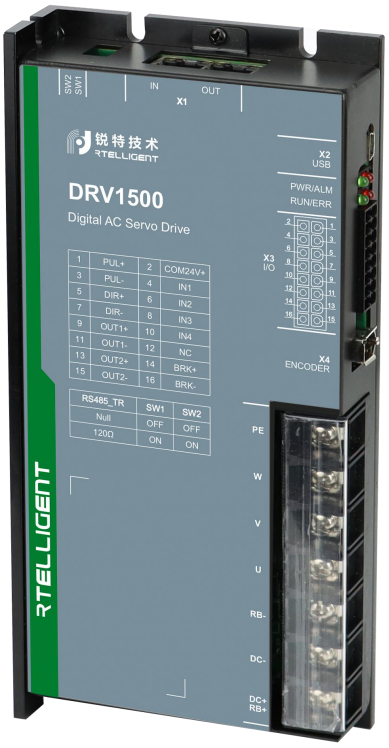
Marking	Output power
400	400W
750	750W
1500	1500W

Marking	Model identification
none	Pulse/RS485
C	CAN
E	EtherCAT

2.1.2 Product appearance

Appearance of DRV400/DRV400C/DRV400E、DRV750/DRV750C/DRV750E:

Appearance of DRV1500/DRV1500C/DRV1500E:



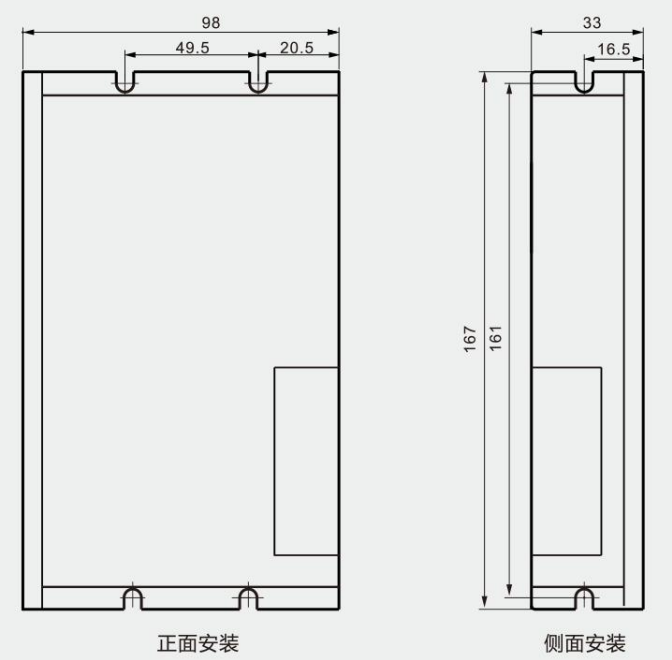
2.1.3 Servo driver specifications

Item	Description		
Driver model	DRV400	DRV750	DRV1500
Continuous output current Arms	12	25	38
Maximum output current Arms	36	70	105
Main circuit power supply	DC 24-70V		
Brake processing function	Braking resistor external		

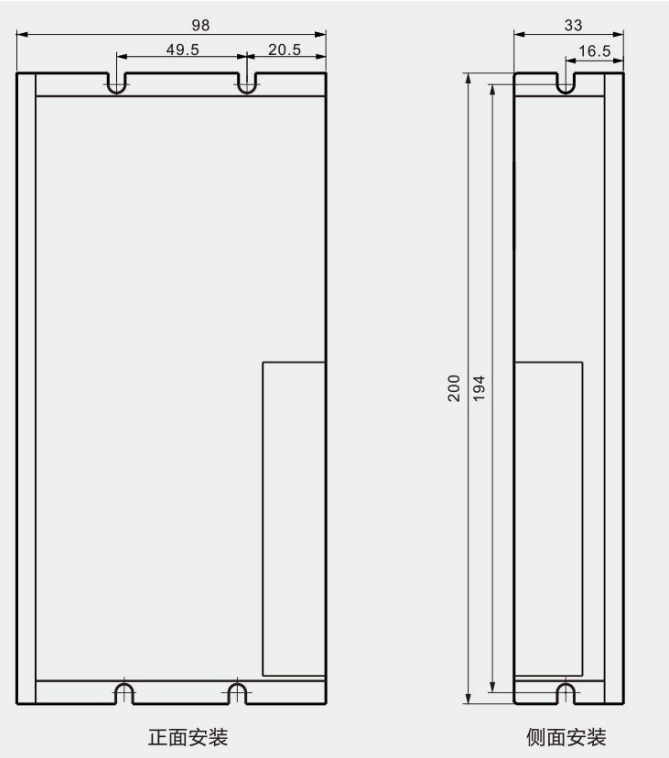
2.2 Driver installation instructions

2.2.1 Installation dimensions

Dimensions of DRV400/DRV400C/DRV400E、DRV750/DRV750C/DRV750E:



Dimensions of DRV1500/DRV1500C/DRV1500E:



2.2.2 Installation site

- Please install in a mounting cabinet free from sun and rain.
- Do not use this product in the vicinity of corrosive and flammable gas environments such as hydrogen sulfide, chlorine, ammonia, sulfur, chlorinated gases, acids, alkalis, salts, combustible materials, etc.
- Do not install in high temperature, humid, dusty, metal dusty environment.

- Vibration-free places.
- Pollution level of the installation site: PD2.

2.2.3 Installation environment conditions

The installation environment of the servo driver has a direct impact on the normal function of the drive and its service life. Therefore, the installation environment of the driver must meet the following conditions:

Item	Description
Operating ambient temperature	0～55°C (ambient temperature is above 45°C, average load rate should not exceed 80%) (no freezing)
Operating ambient humidity	Below 90%RH (no condensation)
Storage temperature	-20～85°C (not freezing)
Storage Humidity	Below 90%RH(no condensation)
Vibration	Below 4.9m/s^2
Shock	Below 19.6 m/s^2
Protection level	IP10
Altitude	Below 1000m

2.2.4 Installation precautions

- Please ensure that the installation direction is perpendicular to the wall, and use natural air convection or a fan to cool the servo driver. Through 2 mounting holes (the number of mounting holes varies according to the capacity), the servo drive is firmly fixed on the mounting surface. When installing, please face the front of the driver to the operator and make it perpendicular to the wall. Please pay attention to avoid drilling iron filings and other foreign matter from falling into the driver during installation, otherwise it may cause the driver to malfunction.
- In order to ensure good heat dissipation conditions, the actual installation should be as large as possible.
- When multiple drives are installed in the control cabinet, please note that sufficient space must be reserved for the placement position to achieve sufficient heat dissipation.
- Be sure to connect the ground terminal to the ground, otherwise there may be a risk of electric shock or interference resulting in malfunction.
- When there is a vibration source (punch) near the driver installation, if it is unavoidable, please use a vibration absorber or install an anti-vibration rubber gasket.
- When there are large magnetic switches, fusion splicers and other noise sources near the driver, it is easy for the driver to be interfered with by the outside world and cause malfunction, so it is necessary to install noise filters, but noise filters will increase the leakage current, so it is necessary to install an insulating transformer at the input of the driver.

Chapter 3 Servo Driver and Motor Wiring

3.1 **Servo driver main circuit connection**

Terminal mark	Terminal name	Terminal function
DC+、DC-	Power supply input terminal	Servo driver power supply input terminal, the voltage is within the range of DC 18-70V
DC+、RB-	Braking resistor terminal	Connect energy consumption braking resistor
U、V、W、PE	Servo motor connection terminal	Servo motor connection terminal, must be connected with the motor U, V, W, PE terminal corresponding

Precautions for circuit wiring:

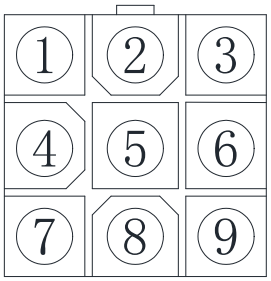
- Do not connect the input power cable to the output U, V, W, otherwise it will cause damage to the servo driver.
- Do not pass or bundle power and signal cables together from the same pipe. To avoid interference, the distance between the two should be more than 30cm.
- Do not ON/OFF the power supply frequently. When it is necessary to ON/OFF the power supply repeatedly and continuously, please control it less than once a minute. Since the power supply part of the servo driver has a capacitor, a large charging current (charging time 0.2s) will flow when the power supply is turned on. If the power is turned on/off frequently, the performance of the main circuit components inside the servo driver will be degraded.
- Please connect the servo driver to the ground reliably, and use a PE wire with a large diameter as much as possible to ensure that the grounding resistance is less than 100 ohms.
- It is recommended that the power supply be supplied through a noise filter to improve the anti-interference ability.
- Please install a non-fuse type (NFB) circuit breaker so that the external power supply can be cut off in time when the driver fails.
- Do not power on and use the servo driver when the terminal screws or cables are loose, otherwise it may cause a fire.

3.2 **Servo driver encoder signal terminal X4 connection**

Servo motor encoder output terminal signal definition: face up to the motor encoder output terminal, its terminal definition serial number is shown in the following diagram:

Schematic diagram of servo motor encoder outlet terminal

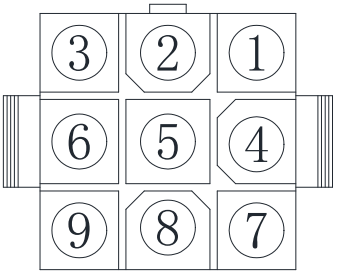
Signal name	Pin number	Function
FG	1	Shield ground
+5V	2	Power input positive: +5V



GND	3	Power input negative: 0V
SD+	4	Encoder bus signal
SD-	5	
E+	6	Encoder battery
E-	7	

Servo encoder extension cable motor-side terminal: face up to the servo encoder extension cable motor-side terminal, the definition number of its terminal is shown in the following diagram:

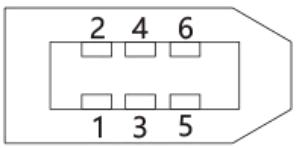
Schematic diagram of motor-side terminal of servo encoder extension cable



Signal name	Pin number	Function
FG	1	Shield ground
+5V	2	Power input positive: +5V
GND	3	Power input negative: 0V
SD+	4	Encoder bus signal
SD-	5	
E+	6	Encoder battery
E-	7	

Servo encoder extension cable driver-side terminal: The servo encoder extension cable driver-side terminal is a soldered pin, and the pin number is marked on it. The definition number of the terminal is shown in the following diagram:

Schematic diagram of driver-side terminal of servo encoder extension cable



Signal name	Pin number	Function
+5V	1	Power input positive: +5V
GND	2	Power input negative: 0V
BAT+	3	Encoder battery
BAT-	4	
SD+	5	Encoder bus signal
SD-	6	
FG	-	Terminal metal shell

3.3 **Servo driver control signal terminal X3 connection**

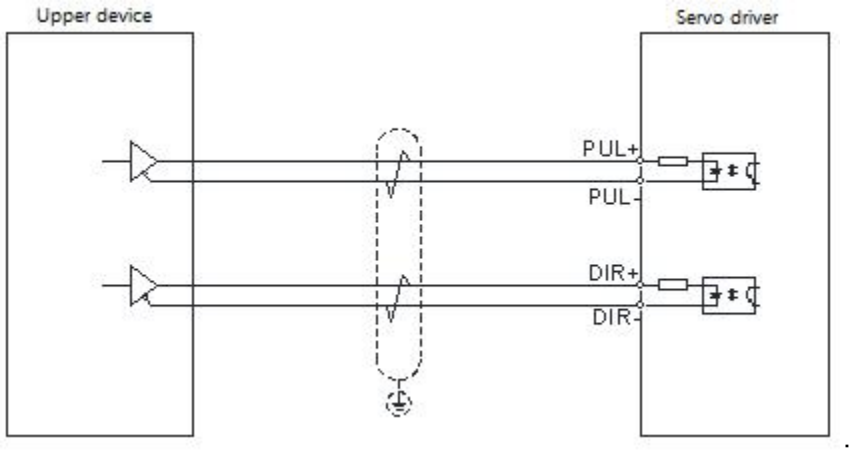
3.3.1 Position command input signal

Note: The pulse input signal can only be connected to the DRV pulse model/RS485 model driver:

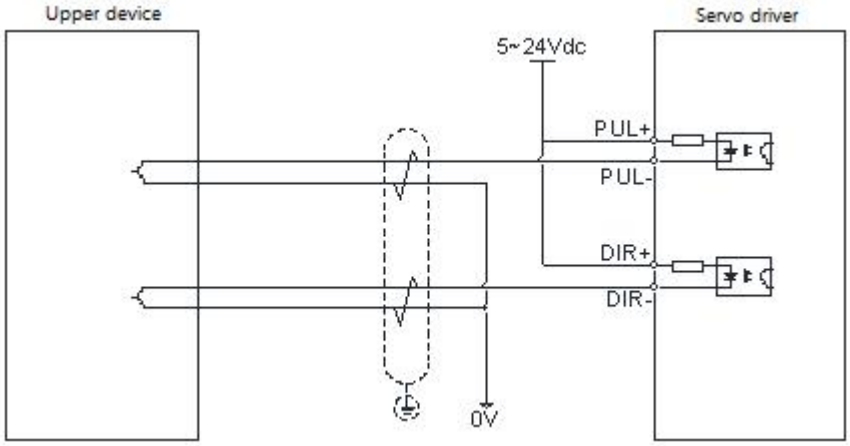
Signal name	Pin number	Function

Position command	PUL+	1	External command pulse input terminal, the input pulse forms are: ● Pulse + direction ● CW/CCW pulse **Note: The signal terminal can accept 5V-24V signals, no need to connect resistors in series**
	PUL-	3	
	DIR+	5	
	DIR-	7	

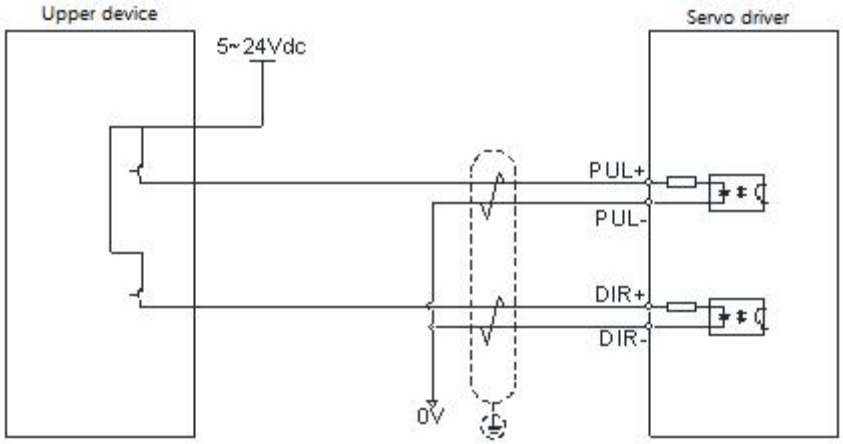
（1） Differential pulse signal



（2） Single-ended common anode signal



（3） Single-ended common cathode signal



3.3.2 Digital input signal

DRV series pulse/RS485 driver:

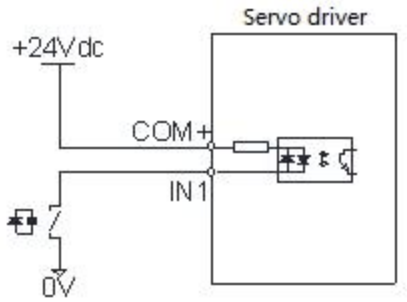
Signal name		Default function	Pin number	Function
General input and output	COM24V+		2	Input terminal common
	IN1	S_ON	4	Servo enable
	IN2	P_OT	6	Positive limit
	IN3	N_OT	8	Negative limit
	IN4	HOME	10	Origin

DRV series EtherCAT、CAN driver:

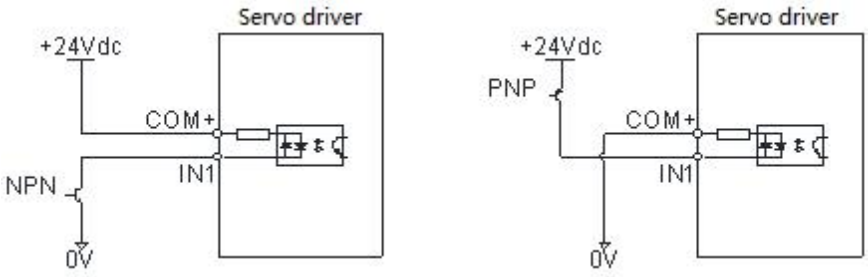
Signal name		Default function	Pin number	Function
General input and output	COM24V+		2	Input terminal common
	IN1	P_OT	4	Positive limit
	IN2	N_OT	6	Negative limit
	IN3	HOME	8	Origin
	IN4	EME	10	Emergency stop
	IN5+	P_OT	1	Probe 1
	IN5-		3	
	IN6+	GEAR_SEL	5	Probe 2
	IN6-		7	

The IN5 and IN6 interface circuits are the same as PUL and DIR, please refer to the wiring instructions of the position command input signal. The interface circuits of IN1～IN4 are the same. Take IN1 as an example.

1） When the upper computer device is a relay output:



2） When the upper computer device is open-collector output:

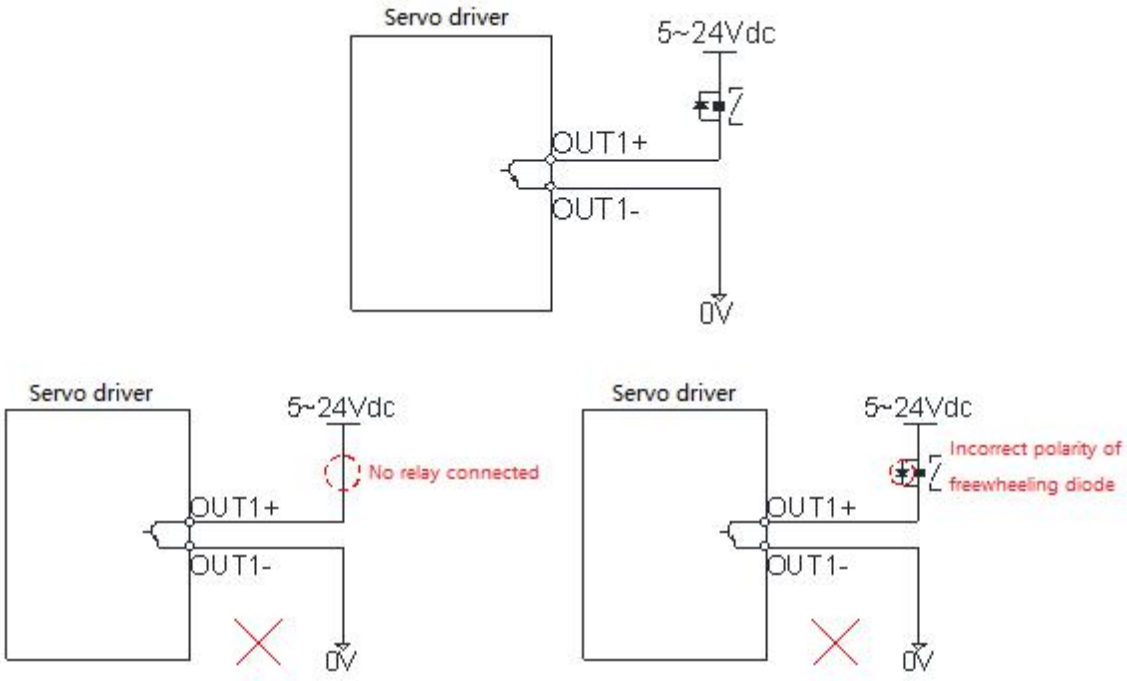


3.3.3 Digital output signal

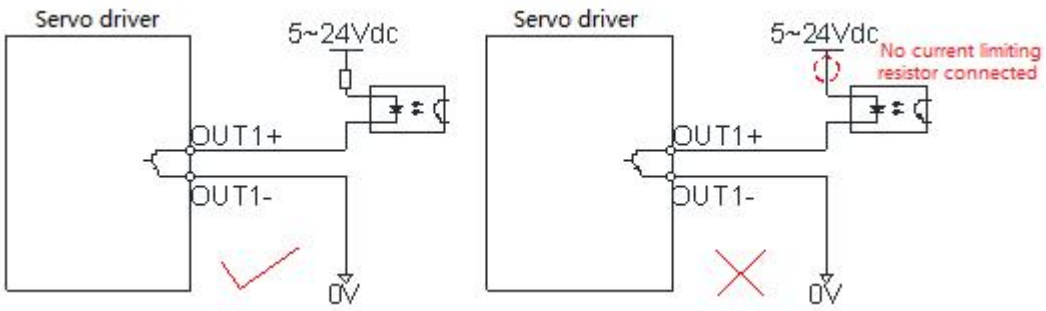
Signal name		Default function	Pin number	Function
General input and output	OUT1+	ALM	9	Alarm output
	OUT1-		11	
	OUT2+	HOME_DONE	13	Homing completed
	OUT2-		15	

The OUT1 and OUT2 interface circuits are the same. Take OUT1 as an example.

1） When the upper device is a relay input::

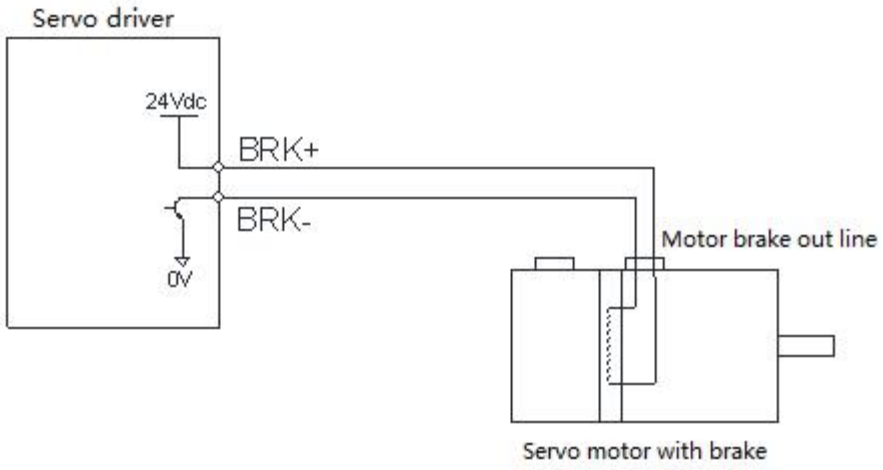


2） When the upper device is optocoupler input:



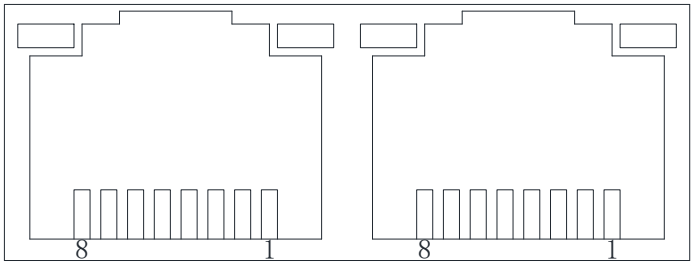
3.3.4 Brake output signal

Signal name		Default function	Pin number	Function
General input and output	BRK+	BRK	14	Brake output terminal **It can be directly connected to the positive and negative signal terminals of the electromagnetic brake of the motor, without driving through a relay**
	BRK-		16	



3.4 **Servo driver communication signal terminal X1**

DRV series pulse/RS485 driver、DRV series CAN driver：

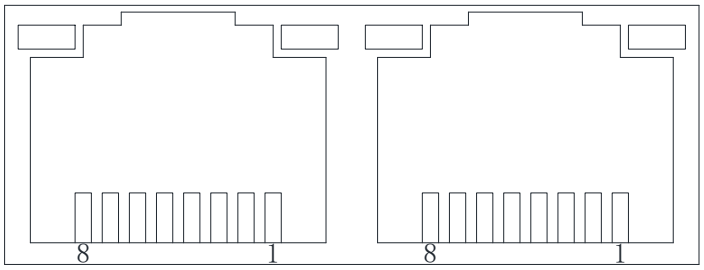


Signal name		Default function	Pin number
Communication	RS485+	1	RS485 communication port

signal	RS485-	2	
	-	3	-
	CAN_H	4	CAN communication port
	CAN_L	5	
	-	6	-
	DGND	7	GND signal
	-	8	-

DRV series EtherCAT driver：

The EtherCAT network cable is connected to the RJ45 terminal with a metal shield, and has input (IN) and output (OUT) interfaces. The electrical characteristics comply with IEEE802.3 and ISO8877 standards.



Pin	Definition	Description
1	TX+	Data send+
2	TX-	Data send-
3	RX+	Data receive+
4	NULL	Null
5	NULL	Null
6	RX-	Data receive-
7	NULL	Null
8	NULL	Null

3.5 **USB serial communication terminal X2**

Customers can modify the parameters of the driver on the PC using the Mini USB communication cable.

3.6 **Anti-interference countermeasures for electrical wiring**

To suppress interference, please take the following measures:

- The length of the command input cable should be less than 3m, and the encoder cable should be less than 20m.

- Use thick wires as much as possible for grounding wiring. (Above 2.0mm^2)
- Please use a noise filter to place radio frequency interference. When using in a civil environment where the power supply interference noise is strong, please install a noise filter on the input side of the power cord.
- In order to place the malfunction caused by electromagnetic interference, the following treatment methods can be adopted:

① Install the upper computer device and the noise filter near the servo driver as far as possible.

② Install surge suppressors on the coils of relays, screw tubes, and electromagnetic contactors.

③ When wiring, please lay the strong current line separately from the weak current line, and keep an interval of more than 30cm. Do not put them in the same pipe or bundle them together.

④ Do not share power supply with electric welders, electrical discharge machining equipment, etc. When there is a high-frequency generator nearby, install a noise filter on the input side of the power cord.

Chapter 4 Operation

4.1 Position control mode

The position control mode is mainly used in occasions that require positioning control, such as manipulators, placement machines, engraving (pulse sequence instructions), CNC machine tools, etc. Set the value of parameter P01.00 to 0 to enable the drive to work in position control mode.

4.1.1 Position command input setting

In position control mode, first set the position command source through P03.00.

★ Description of related parameters

Parm	Name	Setting range	Function	Setting method	Effective time	Factory setting
P03.00	Position command source	0: Pulse command 1: Stepper operation 2: Multi-segment position command 3: Communication control 4: Communication control 2 5: IO control	Set the source of the position command. The pulse command is an external position command, and the others are internal position commands.	Set after stopping	Effective immediately	0

a) The source of position command is pulse command (P03.00=0)

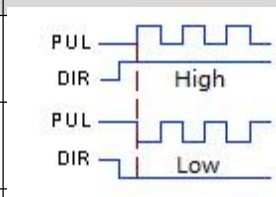
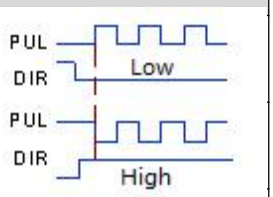
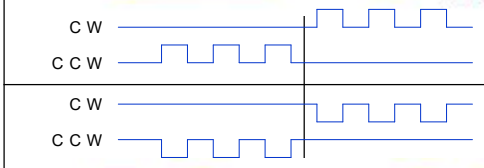
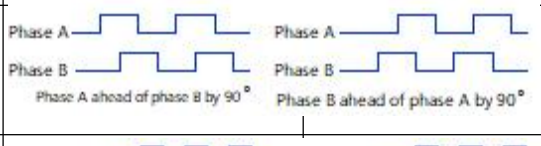
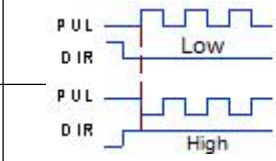
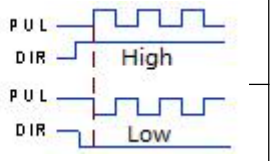
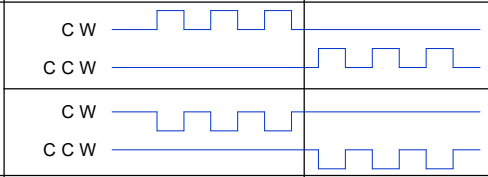
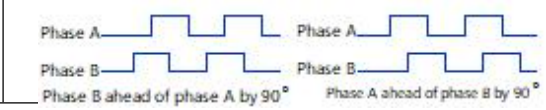
When setting the position command source as pulse command, it is necessary to correctly set the command type of external pulse according to the host computer or other pulse output device:

- Direction + pulse (positive logic or negative logic)
- A phase + B phase quadrature pulse, 4 times frequency
- Positive pulse / negative pulse (CW + CCW)

★ Description of related parameters

Parm	Name	Setting range	Function	Setting method	Effective time	Factory setting
P03.01	Pulse command type	0: direction + pulse (positive logic) 1: Direction + pulse (negative logic) 2：CW + CCW 3: A phase + B phase quadrature pulse, 4 times the frequency	Select the type of external pulse command	Set after stopping	Save and restart	0

Table 4-2 Description of pulse command types

P01.01 Rotation direction selection	P03.02 Command type setting	Command type	Signal	Schematic diagram of forward pulse	Schematic diagram of reverse pulse
0	0	Pulse + direction Positive logic	PUL DIR		
	1	Pulse + direction Negative logic	PUL DIR		
	2	CW+CCW	PUL(CW) DIR(CCW)		
	3	A phase + B phase Quadrature pulse 4 times frequency	PUL(A phase) DIR(B phase)		
1	0	Pulse + direction Positive logic	PUL DIR		
	1	Pulse + direction Negative logic	PUL DIR		
	2	CW+CCW	PUL（CW） DIR（CCW）		
	3	A phase + B phase Quadrature pulse 4 times frequency	PUL(A phase) DIR(B phase)		

b) The position command source is the step amount (P03.00=1)

In this position command source:

- The fixed-length operation of the motor is controlled through the external input terminal, and the direction of operation is determined by the sign of the pulse command stroke.

(1) **Control motor fixed-length forward/reverse rotation through external input terminal**

★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P03.28 P03.29	Stepper operation	-1073741824～1073741824	Common unit	Set the motor's fixed-length running stroke Positive number means positive direction rotation Negative number means negative direction rotation	Set when running	Next run	10000
P03.30	Stepper running speed	0～6000	r/min	Set the motor's fixed-length running speed	Set when running	Next run	1000
P03.31	Stepper	1～65535	ms	Set the time for the motor's fixed-	Set when	Next run	200

	operation acceleration time constant			length running speed to uniformly accelerate from 0r/min to 1000r/min	running		
P03.32	Stepper operation deceleration time constant	1～65535	ms	Set the time that the motor's fixed-length running speed is uniformly decelerated from 1000r/min to 0r/min	Set when running	Next run	200
P01.33	Emergency stop deceleration time constant	1～65535	ms	Set the time for the motor to decelerate uniformly from 1000r/min to 0r/min when the motor is in emergency stop	Set when running	Next run	30

The startup mode is as follows:

1、 1. Set the corresponding IN terminal function to 13 (FunIN13: stepper position trigger), and confirm the valid logic of the IN terminal. Group P02: terminal input/output parametes

★ Description of related parameters

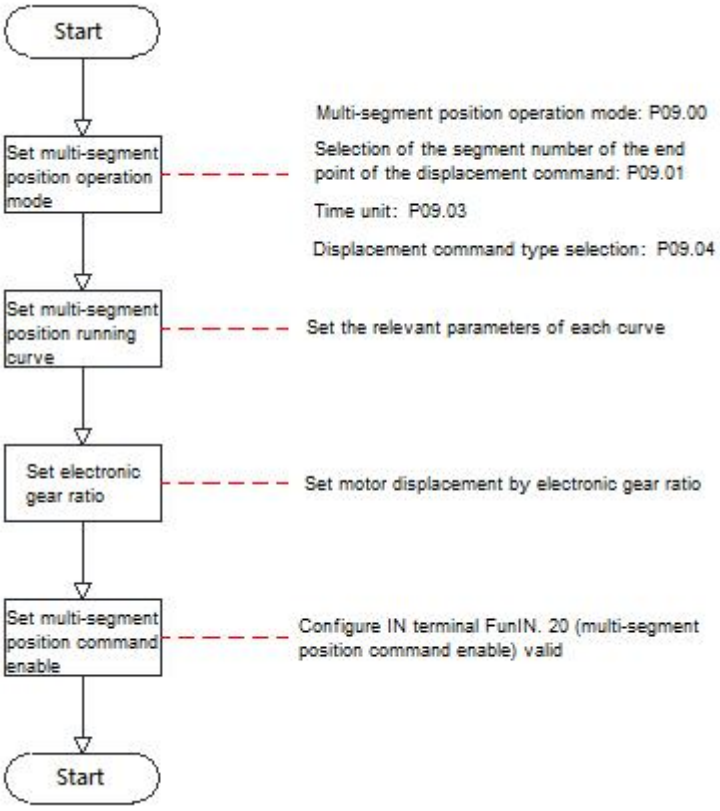
Code	Function name	Function
FunIN.13	stepper position trigger	The servo running status is as follows: Valid: the motor runs the position command stroke set by parameter P03.28/P03.29 Invalid: the servo motor is in the locked state

FunIN.13 (stepper position trigger) is valid for edge change, the stepper position command is completed and the servo motor enters the locked state, if FunIN.13 is triggered again, the servo motor will repeat the position command stroke set in P03.28/P03.29.

● Note: The motor will not respond to the re-trigger signal if the motor's current position command is not run to end stop. The user can receive the output signal (FunOUT.5: internal position command stop) through the host computer, which is used to determine whether the internal pulse of the servo driver has been sent to determine the validity of the trigger again.

c) The source of position command is multi-segment position command (P03.00=2)

The servo driver has the function of multi-segment position operation. It means that there are 16 position commands stored inside the servo driver, and the displacement, maximum operating speed and acceleration/deceleration time of each segment can be set separately. The waiting time and connection mode between the segments can also be selected according to actual needs. The setting process is as follows:

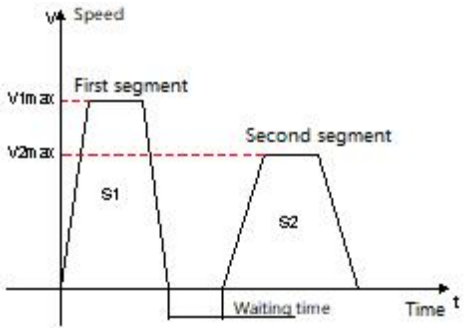


① Set multi-segment position operation mode

★ Description of related parameters

Parm	Name	Setting range	Function	Setting method	Effective time	Factory setting
P09.00	Multi-segment position operation method	0: Shutdown at the end of a single run 1: Cycle operation 2: IN switching operation	Set the connection mode between the multi-segment position running section and the section	Set after stopping	Next run	1
P09.01	Number of position command end segments	1～16	Set the total number of segments of multi-segment position commands	Set after stopping	Next run	1
P09.03	Waiting time unit	0：ms 1：s	Set the waiting time unit. Note: the waiting time is only valid when P09.00=0 or 1	Set after stopping	Next run	0
P09.04	Displacement command type selection	0: Incremental position command 1: Absolute position command	Set the type of multi-segment displacement command	Set after stopping	Next run	0

- Shutdown at the end of a single run (P09.00=0)

Mode description	Running curve
● Run 1 round ● The segment number is automatically incremented and switched ● The waiting time can be set between each segment ● FunIN.21 (multi-segment position command enable) signal is level effective	

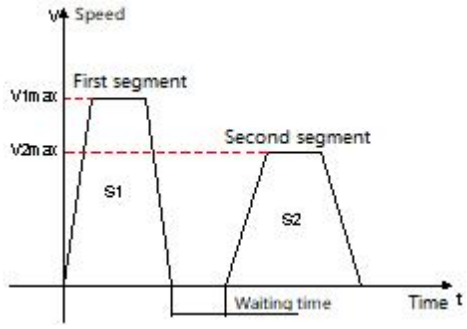
V_{1max}、V_{2max}: Maximum operating speed of the first and second

	segment S_1、S_2: Segment 1 and segment 2 displacement ● After each segment of operation is completed, the motor's internal command stop signal output is valid; ● When the multi-segment position command is enabled OFF during operation, the driver gives up the uncompleted displacement of this segment and stops, and the positioning completion signal is valid after the stop is completed ● Re-enable the multi-segment position command, and the driver will start to run sequentially from the first segment again

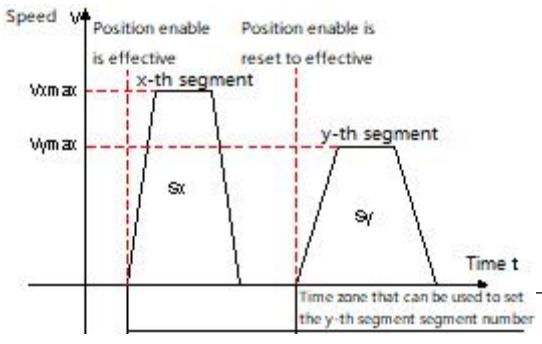
★ Term explanation:

The total number of multi-segment position commands set by P09.01 when the driver completes one run is called the completion of one round of operation.。

● Cycle operation (P09.00=1)

Mode description	Running curve
● Cycle operation, the starting segment number of each round is 1; ● The segment number is automatically incremented and switched; ● Waiting time can be set between each segment; ● The FunIN.21 (multi-segment position command enable) signal is level valid, and its signal is valid, the driver will keep cyclic operation status.	 V_{1max}、V_{2max}: Maximum operating speed of the first and second segment S_1、S_2: The first segment and the second segment displacement ● After each segment of operation is completed, the motor's internal command stop signal output is valid; ● When the multi-segment position command is enabled OFF during operation, the driver gives up the uncompleted displacement of this segment and stops, and the positioning completion signal is valid after the stop is completed ● Re-enable the multi-segment position command, and the driver will start to run sequentially from the first segment again

● IN switching operation (P09.00=2)

Mode description	Running curve
● When running the current segment number, the next running segment number can be set, and the motor will stop after completing the position command set by the current segment number. After the multi-segment position command enable is set to ON again, run this time period number command	

● The segment number is determined by the IN terminal logic ● There is no waiting time between each segment, the interval time is determined by the command delay of the host computer ● FunIN.21 (segment position command enable) signal is valid for edge change	V_{xmax}、V_{ymax}: Maximum operating speed of the x-th and y-th segment S_x、S_y: The x-th segment and the y-th segment displacement ● After each stage of operation is completed, the internal command stop signal output of the motor is valid; ● During operation, the multi-segment position command enable is OFF, the driver continues to execute the unfinished displacement of this segment, and outputs the positioning completion signal ● The switching segment numbers must be in the following order: ①The segment number switch is invalid before the positioning of the x-th segment is completed ②During the x-th segment displacement operation or after the positioning is completed, turn off the multi-segment position command first, and then switch the segment number from x to y (if x=y, the driver will execute the x-segment displacement again) ③After the x-th segment displacement positioning is completed, the multi-segment position command enable is set to ON, and the driver executes the y-th segment displacement

When the multi-segment position operation mode is set to IN switching operation, please configure the 4 IN terminals of the drive (the number of IN terminals required can be set according to the actual number of running stages) as functions 14～17 (FunIN.13～FunIN.16: multi-segment position command switching), and confirm the valid logic of IN terminal.

★ Description of related parameters

<table>
<tr><th>Code</th><th>Name</th><th>Function name</th><th>Function</th></tr>
<tr><td>FunIN.14</td><td>CMD1</td><td>Multi-segment operation command switching 1</td><td rowspan="4">The multi-segment segment number is a 4-digit binary number, and the corresponding relationship between CMD1 ～ CMD4 and the segment number is as follows:
<table>
<tr><th>CMD4</th><th>CMD3</th><th>CMD2</th><th>CMD1</th><th>Segment number</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>2</td></tr>
<tr><td colspan="5">……</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>15</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>16</td></tr>
</table>
The logic of the IN terminal is level valid, the CMD value is 1 when the input level is valid, otherwise it is 0</td></tr>
<tr><td>FunIN.15</td><td>CMD2</td><td>Multi-segment operation command switching 2</td></tr>
<tr><td>FunIN.16</td><td>CMD3</td><td>Multi-segment operation command switching 3</td></tr>
<tr><td>FunIN.17</td><td>CMD4</td><td>Multi-segment operation command switching 4</td></tr>
</table>

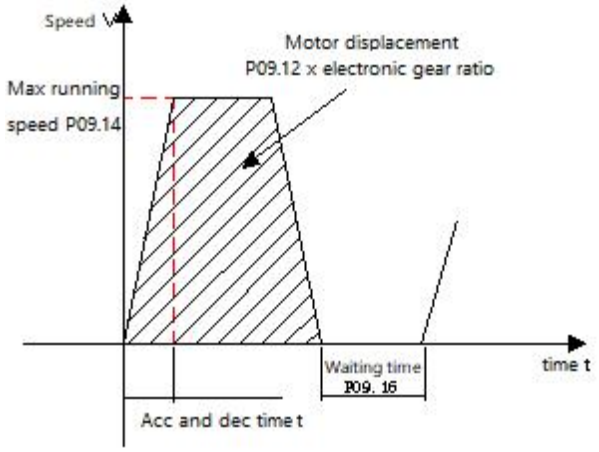
② Set multi-segment position operation curve

The multi-segment position running function can set 16 different position commands, and the displacement, maximum running speed, acceleration and deceleration speed of each segment and the waiting time between segments can be set separately. Take the 1st segment as an example.

★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P09.12 P09.13	Movement displacement of the 1st segment	-1073741824～1073741824	Command unit	Set the sum of position commands in the 1st segment	Set when running	Next run	10000
P09.14	Maximum operating speed of the 1st displacement	0～6000	rpm	Set the maximum operating speed of the 1st segment	Set when running	Next run	200
P09.15	Acceleration and deceleration time constant of the 1st displacement	1～65535	ms	Set the time for motor to change from 0rpm to 1000rpm in the 1st segment of the multi-segment position	Set when running	Next run	100
P09.16	Waiting time after the 1st segment of displacement is completed	0～65535	ms(s)	Set the waiting time after the 1st segment positioning is completed	Set when running	Next run	100

According to the above settings, the actual operating curve of the motor is shown in the figure below:



Therefore, the actual acceleration time t to P09.14 (the maximum operating speed of the 1st displacement):

$$t = \frac{P09.14}{1000} \times P09.15$$

For the setting of the remaining 15 parameters, please refer to the parameter descriptions in Chapter 6.

③ Multi-segment position command enable

When selecting multi-segment position command as the source of position command, please configure 1 IN terminal of the servo driver as function 21 (FunIN.21: multi-segment position command enable), and confirm the valid logic of IN terminal.

★ Description of related parameters

Code	Name	Function name	Function
FunIN.21	PosInSen	Multi-segment position command enable	Valid: motor runs multi-stage position command Invalid: the motor is in a locked state Notice: When P09.00=0/1, the logic of IN terminal corresponding to FunInSen signal is valid for level When P09.00=2, the logic of IN terminal corresponding to FunInSen signal is valid along the change

d) The source of position command is communication control (P03.00=2)

Under this position command source, the start and stop of the motor can be controlled through communication, and the corresponding parameters can also be set to make the motor work in continuous operation in one direction/reciprocating direction (demonstration operation mode) for debugging purposes or aging testing purposes.

★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P04.60 P04.61	Number of communication command pulses	0～1073741824	Command unit	Set the number of command pulses for communication operation	Set when running	Next run	50000
P04.62	Communication speed	0～6000	rpm	Setting the maximum speed for communication operation	Set when running	Next run	1000
P04.63	Communication acceleration time constant	1～65535	ms	Set the time for the motor speed to accelerate uniformly from 0rpm to 1000rpm	Set when running	Next run	200
P04.64	Communication deceleration time constant	1～65535	ms	Set the time for the motor speed to decelerate uniformly from 1000rpm to 0rpm	Set when running	Next run	200
P04.65	Internal demo operation mode	0～1	-	Set the operation mode of internal demo operation 0: Motor reciprocating 1: Motor runs in one direction	Set when running	Next run	0
P04.66	Internal demo start running direction	0～1	-	Set the starting direction of the internal demo run 0: positive direction 1: negative direction	Set when running	Next run	0
P04.67	Number of internal demo runs	0～65535	-	Set the number of runs of internal demo run	Set when running	Next run	Next run
P12.09	Communication displacement mode	0～1	-	Set the type of position command for communication operation: 0 - Incremental position mode 1 - Absolute position mode	Set when running	Next run	Next run
P12.10	Communication start/stop command	0～6	-	Start/stop command for driver communication operation	Set when running	Next run	6
P12.12	Internal demo waiting time	0～65535	ms	Set the waiting time for internal demo operation	Set when running	Next run	200
P12.13	Internal demo start/stop command	0～2	-	Start/stop command for internal demo operation of the driver	Set when running	Effective immediately	0
P01.33	Emergency stop	1～65535	ms	When setting the emergency	Set when	Effective	30

	deceleration time constant			stop, the motor speed uniformly decelerates from 1000rpm to 0rpm	running	immediately	

The startup method is as follows:

1、 The motor works in communication control mode: write the start and stop commands for operation through P12.10, and the motor will run in accordance with the operation curve determined by the command stroke, speed and acceleration/deceleration time constant set by P04.60～P04.64.

Value written in P12.10	Description
0	Write: trigger the motor to decelerate to stop. After the motor responds to the start-stop command, set P12.10 to 6;
1	Write: Trigger the motor to run forward of the command set by P04.60 and stop. After the motor responds to the start-stop command, set P12.10 to 6;
2	Write: Trigger the motor to run reversely of the command set by P04.60 and stop. After the motor responds to the start-stop command, set P12.10 to 6;
3	Write: Trigger the motor to jog forward. After the motor responds to the start-stop command, set P12.10 to 6;
4	Write: Trigger the motor to jog reverse. After the motor responds to the start-stop command, set P12.10 to 6;
5	Write: trigger the emergency stop of the moto.. After the motor responds to the start-stop command, set P12.10 to 6;
6	Write: meaningless; Read: indicate that the motor is running or waiting to be triggered to run;

2、 The motor works in cyclic operation (demonstration) mode: write the start and stop instructions of the demonstration through P12.13. In the demo running mode, the motor will start in reciprocating or single direction (P04.65=0/1) according to the running command, speed, acceleration and deceleration time constant set by P04.60～P04.64, and start in positive or negative direction (P04.66=0/1), run the number of times set by P04.67. After completing the set running command each time and setting the delay time by P12.12, restart again and run in this cycle.

Value written in P12.13	Description
0	Write: stop the operation of the demo mode; read: indicate that the motor is waiting to be triggered to run;
1	Write: start the operation of the demo mode; set P12.13 to 2 after the motor responds to the start-stop command;
2	Write: meaningless; Read: means that the motor is working in demo mode;

e) The source of position command is communication trigger control (P03.00=4)

Under this position command source, the relative stroke or absolute position parameter P03.58 of the operation can be written through communication (P03.57 is displayed on the LED display panel of the driver, and the position command stroke is composed of the two registers P03.57/P03.58 to form a signed 32-bit integer value, where P03.57 is the low 16-bit value, and P03.58 is the high 16-bit value. **The trigger mode of communication**

control is to write the value of P03.58 (high 16 bits) by communication to start running), when the motor is running, the upper computer can dynamically modify the stroke, speed, acceleration and deceleration through communication, and the driver responds to the operating parameters immediately.

★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P03.53	Operating position mode	0～1	-	Set the position mode of the driver operation 0: Incremental position mode 1: Absolute position mode	Set after stopping	Effective immediately	0
P03.54	Communication control acceleration	1～65535	ms	Set the time to accelerate uniformly from 0rpm to 1000rpm	Set when running	Effective immediately	100
P03.55	Communication control deceleration	1～65535	ms	Set the time to decelerate uniformly from 1000rpm to 0rpm	Set when running	Effective immediately	100
P03.56	Communication control speed	0～6000	rpm	Set the speed of communication control operation	Set when running	Effective immediately	500
P03.57 P03.58	Communication control position	-1073741824～1073741824	Command unit	Set the stroke/position of communication control operation Pn229 is the high 16 bits, and Pn228 is the low 16 bits. Communication writing to Pn229 will immediately trigger a run (when the motor is stopped) or dynamically modify the running position (when the motor is running)	Set when running	Effective immediately	10000

- Write the high 16-bit register (P03.58) of the stroke/position through the host computer communication to realize the start of the motor;
- In the incremental position mode, when the motor is running and the reverse running stroke (P03.57/P03.58) is triggered by communication, the motor will run the user-set reverse stroke with the stop position as the starting point after decelerating and stopping according to the set deceleration time constants.

f) The source of position command is fixed length/jog control(P03.00=5)

When the position command source is set to fixed-length/jog control, it has the following functions:

- Control the motor's fixed-length forward and reverse through external input terminals
- Control motor jog forward and reverse through external input terminal
- Control motor jogging through external input terminals: start-stop + direction mode

⑴ Control the motor's fixed-length forward and reverse through external input terminals

★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P04.20	Point velocity	0～6000	rpm	Set the maximum speed of operation	Set when running	Next run	200
P04.22	Point	1～65535	ms	Set the time for the motor	Set when	Next run	100

	acceleration			speed to uniformly accelerate from 0rpm to 1000rpm	running		
P04.23	Point deceleration	1～65535	ms	Set the time for the motor speed to decelerate uniformly from 1000rpm to 0rpm	Set when running	Next run	100
P04.24 P04.25	Point stroke	-1073741824～1073741824	Command unit	Set the stroke/position of the motor running at a fixed length	Set when running	Next run	10000
P01.33	Emergency stop deceleration time constant	1～65535	ms	When setting the emergency stop, the motor speed uniformly decelerates from 1000rpm to 0rpm	Set when running	Effective immediately	30

The start-up operation mode is as follows:

2、 Set the corresponding IN terminal function to "FunIN.27: USER4 (fixed length forward)", "FunIN.28: USER5 (fixed length reverse)" P02 group: terminal input/output parameters, use external input to trigger the start.

3、 Note that: the trigger signal is an edge signal. Triggering the start again while the motor is running will not work. Similarly, if the trigger signal remains valid, the motor will still not respond to other operating modes in the command source after it stops.

⑵ Control motor jog forward and reverse through external input terminal

★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P04.20	Jog forward speed	0～6000	rpm	Set the maximum speed of operation	Set when running	Next run	200
P04.21	Jog reverse speed	0～6000	rpm	Set the maximum speed of operation	Set when running	Next run	200
P04.22	Jog acceleration	1～65535	ms	Set the time for the motor speed to uniformly accelerate from 0rpm to 1000rpm	Set when running	Next run	100
P04.23	Jog deceleration	1～65535	ms	Set the time for the motor speed to decelerate uniformly from 1000rpm to 0rpm	Set when running	Next run	100
P01.33	Emergency stop deceleration time constant	1～65535	ms	When setting the emergency stop, the motor speed uniformly decelerates from 1000rpm to 0rpm	Set when running	Effective immedia tely	30

The start-up operation mode is as follows:

1、 Set the corresponding IN terminal function to "FunIN.25: USER2 (jogging forward)", "FunIN.26: USER3 (jogging reverse)" P02 group: terminal input/output parameters , use external input to trigger the start (the trigger signal is level effective).

⑶ Control motor jogging through external input terminals: start-stop + direction mode

★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P04.20	Jog forward speed	0～6000	rpm	Set the maximum speed of operation	Set when running	Next run	200
P04.21	Jog reverse speed	0～6000	rpm	Set the maximum speed of operation	Set when running	Next run	200
P04.22	Jog acceleration	1～65535	ms	Set the time for the motor speed to uniformly accelerate from 0rpm to 1000rpm	Set when running	Next run	100
P04.23	Jog deceleration	1～65535	ms	Set the time for the motor speed to decelerate uniformly from 1000rpm to 0rpm	Set when running	Next run	100
P01.33	Emergency stop deceleration time constant	1～65535	ms	When setting the emergency stop, the motor speed uniformly decelerates from 1000rpm to 0rpm	Set when running	Effective immediately	30

The start-up operation mode is as follows:

2、 Set the corresponding IN terminal function as "FunIN.24: USER1 (jogging start and stop)", "FunIN.18: torque command direction setting (jogging direction)" P02 group: terminal input/output parameters, Use the external input to trigger the start and stop of the motor and control the direction of the motor (the trigger signal is level effective).

4.1.2 Electronic gear ratio

（1） Electronic gear ratio concept

In the position control mode, the input position command (command unit) is to set the load displacement, and the motor position command (encoder unit) is to set the motor displacement, in order to establish the proportional relationship between the motor position command and the input position comman, the electronic gear ratio function is introduced.

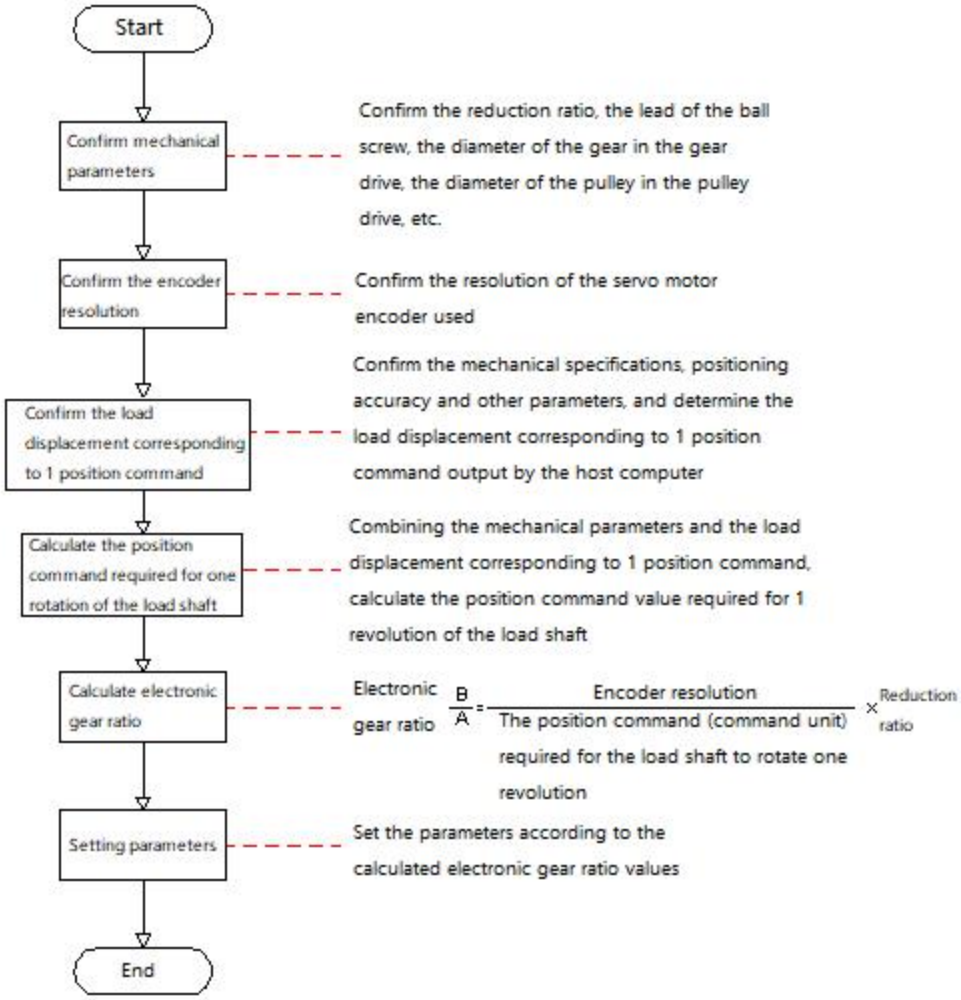
Through the frequency division (electronic gear ratio<1) or frequency multiplication (electronic gear ratio>1) function of the electronic gear ratio, the actual displacement of the motor rotation or movement can be set when the input position command is 1 command unit.

★ Term explanation:

"Command unit": Refers to the minimum recognizable value input from the upper device to the driver.

"Encoder unit": refers to the value of the input command after processing the electronic gear ratio.

（2） Setting steps of electronic gear ratio



★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P03.06 P03.07	Number of position commands for one motor rotation	0～8388608	p/r	Set the number of position commands required for one rotation of motor	Set after stopping	Effective immediately	10000
P03.08 P03.09	Electronic gear ratio 1 numerator	1 ～ 1073741824	-	Set the numerator of electronic gear ratio 1 ● Effective when P03.06/P03.07 is set to 0	Set after stopping	Effective immediately	1
P03.10 P03.11	Electronic gear ratio 1 denominator	1 ～ 1073741824	-	Set the numerator of electronic gear ratio 1 ● Effective when P03.06/P03.07 is set to 0	Set after stopping	Effective immediately	1
P03.12 P03.13	Electronic gear ratio 2 numerator	1 ～ 1073741824	-	Set the numerator of electronic gear ratio 1 ● Effective when P03.06/P03.07 is set to 0	Set after stopping	Effective immediately	1
P03.14 P03.15	Electronic gear ratio 2 denominator	1 ～ 1073741824	-	Set the numerator of electronic gear ratio 1 ● Effective when P03.06/P03.07 is set to 0	Set after stopping	Effective immediately	1

- **Note: When P03.06 (number of position commands for one motor rotation) is set to other than 0, the electronic gear ratio $\frac{A}{B} = \frac{Encoder\ resolution}{P03.06}$, at this time, electronic gear ratio 1 (P03.08/P03.10) and electronic gear ratio 2 (P03.12/P03.14) have no effect.**

4.1.3 Position command filtering

Position command filtering is to filter the position command (encoder unit) after the electronic gear ratio frequency division or frequency multiplication. The methods are average filtering and first-order low-pass filtering. In the following applications, you should consider adding position command filtering:

- The position command output by the host computer has not been processed for acceleration and deceleration
- Low pulse command frequency
- When the electronic gear ratio is more than 10 times

★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P03.04	Position command average filter time constant	1～2048	0.1ms	Set the time constant for the average value filter of the position command (encoder unit)	Set after stopping	Effective immediately	1
P03.05	Position command first-order low-pass filter time constant	0～65535	0.1ms	Set the first-order low-pass filter time constant of position command	Set after stopping	Effective immediately	0

- This function has no effect on the displacement (total number of position commands).
- If the set value is too large, the response delay will increase. The filter time constant should be set according to the actual situation.

4.1.4 Positioning complete signal

The positioning completion function means that the drive detects that the stop time of the position command exceeds the time set by the user (P03.21: Position command stop detection time), and the position deviation meets the condition set by the user (P03.22: Positioning completion threshold), and maintain for a certain time (P03.20: Arrival signal establishment time), until the position completion signal is output.

★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P03.20	Arrival signal establishment time	0～65535	0.1ms	Set the arrival establishment time when the motor arrival signal is output	Set when running	Effective immediately	10
P03.21	Position command stop detection time	0～65535	0.1ms	Set the pulse stop detection time when the motor arrival signal is output	Set when running	Effective immediately	10
P03.22	Positioning completion threshold	1～65535	Encoder unit	Set the positioning accuracy when the motor arrival signal is output	Set when running	Effective immediately	10

4.1.5 Homing function

（1） Function introduction

Origin: the mechanical origin, which can be expressed as the origin switch signal or limit switch signal, set by the parameter P03.41 (homing mode selection).

Zero point: the positioning target point, which can be expressed as origin + offset (P03.46/P03.47: mechanical origin offset). When the offset is set to 0, the zero point coincides with the origin.

The homing function is the function of triggering the return-to-origin function when the driver is enabled, the motor will actively find the zero point to complete the positioning.

During the homing operation, other position commands (including the retriggered homing enable signal) are shielded; after the homing operation is completed, the driver can respond to other position commands.

The homing function includes two modes: home return to zero and electrical return to zero.

Home return to zero: After the driver receives the origin return trigger signal, it will actively locate the relative position of the motor shaft and the mechanical origin according to the preset mechanical origin. First find the origin, and then move the offset based on the origin to reach the zero position. The zero point return is usually used when searching for zero point for the first time.

Electrical return to zero: After the zero position is determined by the home return to zero operation, the current position is used as the starting point to move a certain relative displacement.

After the home return is completed (including home return to zero and electrical return to zero), the current position of the motor (P13.07/P13.08: position command counter) is the same as the mechanical home offset (P03.46/P03.47: mechanical home offset).

After the home return is completed, the driver outputs the home return to zero completion signal, and the upper computer can confirm the home return completion after receiving the signal.

（2） Home return to zero

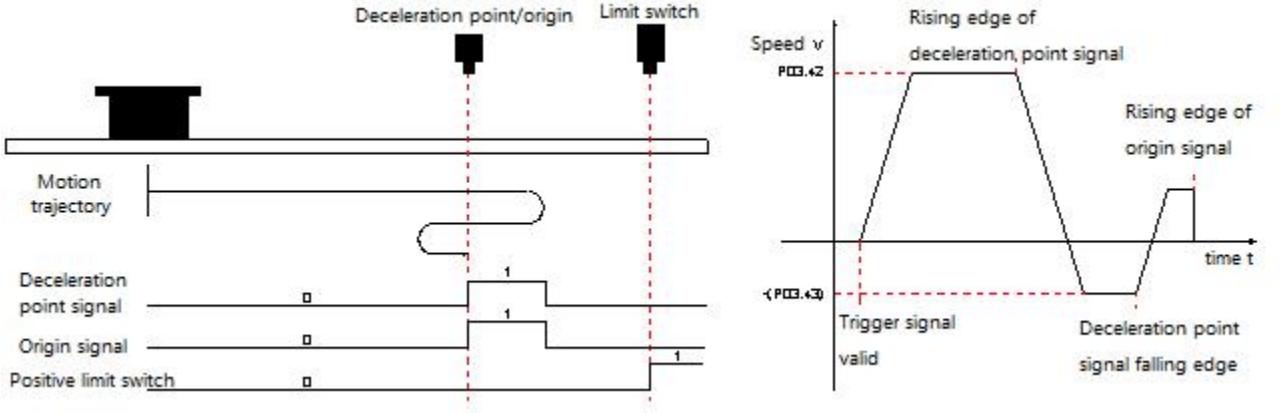
The following cases are used as examples to illustrate the operation mode of home return to zero:

- **Forward home return: deceleration point, home point as home switch (P03.41 = 0)**
- **Forward home return: deceleration point and home point are forward limit switches (P03.41 = 2)**
- **Forward return home: deceleration point and home position are mechanical limit positions (P03.41 = 4)**

(a) Forward home return: deceleration point, home point as home switch (P03.41 = 0)

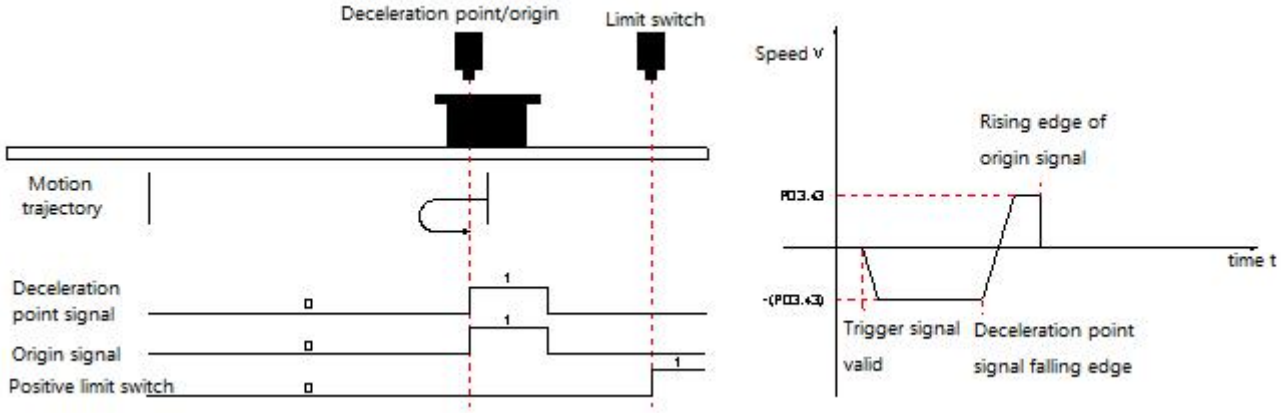
① The home switch (deceleration point) signal is invalid (0 - invalid, 1 - valid) before the motor returns to the home position, and the positive limit switch is not triggered in the whole process

The motor first searches for the deceleration point signal in the forward direction at the set value of P03.42 (speed of high-speed search for home switch signal) until it encounters the rising edge of the deceleration point. After decelerating to 0 according to the deceleration time constant set in P03.44 (acceleration/deceleration time constant for low-speed search home switch signal), it reverses the acceleration to the set value of -P03.43 (speed of low-speed search home switch signal) and searches for the deceleration point signal falling edge at low speed. When it encounters the falling edge of the deceleration point signal, it will decelerate and stop, and then continue to search for the rising edge of the deceleration point in the low-speed forward direction with the set value of P03.43. During forward acceleration or forward uniform speed operation, the machine will stop immediately when it encounters the rising edge signal of the origin signal.



② The home switch (deceleration point) signal is valid (0 - invalid, 1 - valid) before the motor returns to the home position, and the positive limit switch is not triggered in the whole process

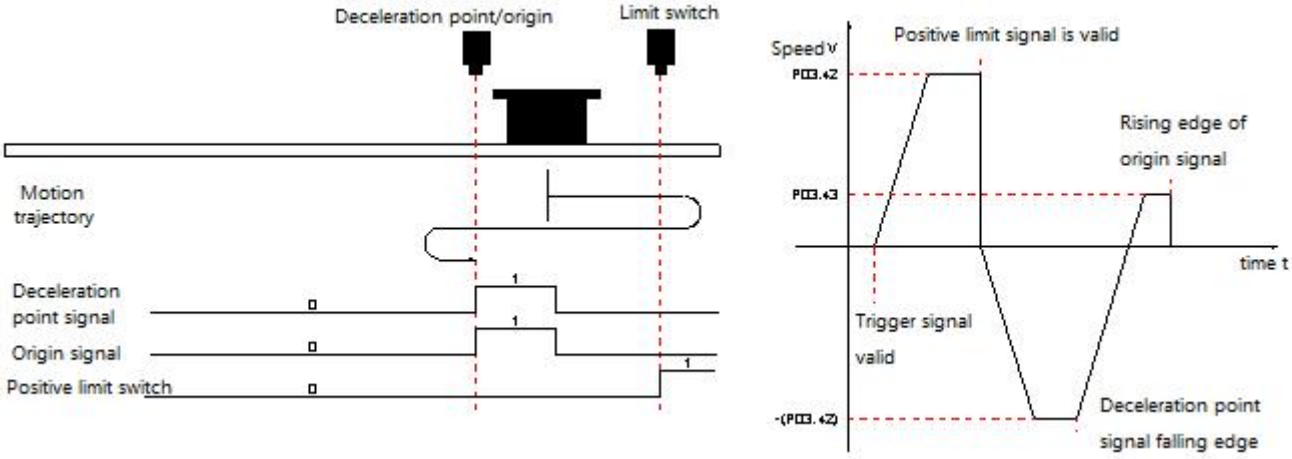
The motor directly searches for the falling edge of the deceleration point signal in the reverse direction at the set value of -P03.43 (low speed search for the origin switch signal), and decelerates to stop when it encounters the falling edge of the deceleration point signal, and then continues to search for the rising edge of the deceleration point signal in the forward direction with the set value of P03.43, and stops immediately when it encounters the rising edge of the home signal in the forward direction of acceleration or uniform speed operation.



③ Home switch (deceleration point) signal is invalid (0- invalid, 1- valid)before the motor returns to the home position , and the positive limit switch is triggered during the process of returning to the home position

The motor first searches for the deceleration point signal in the forward direction with the set value of P03.42 (speed of high-speed search for home switch signal), and stops after encountering the positive limit switch and decelerating to 0 according to the deceleration time constant set in P01.33 (emergency stop deceleration time constant). And in accordance with P03.49 (mechanical origin offset and limit processing method), immediately return to the origin in reverse direction (P03.49=2/3), or stop and wait for the upper device to give the trigger signal to return to the home position again (P03.49=0/1). After the conditions are met, the motor searches for the falling edge of the deceleration point signal in the reverse direction with the set value of -P03.42. After encountering the deceleration point signal falling edge, decelerate the speed to 0 in accordance with the deceleration time set by P03.44 (acceleration and deceleration time constant of searching for the original switch signal), and then forward accelerate to the set value of P03.43 (speed of searching for the original switch signal

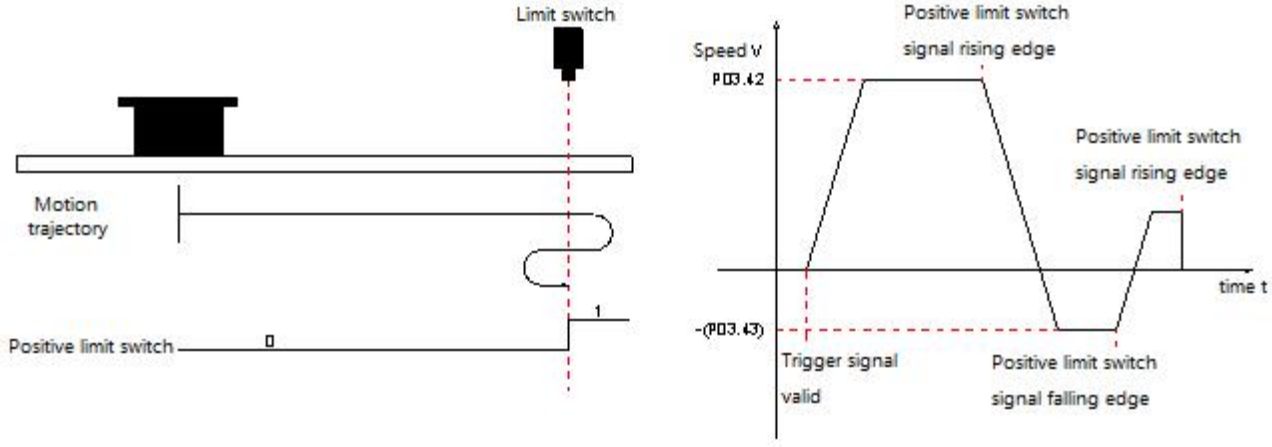
at low speed), and forward accelerate or forward uniformly in operation, and stop immediately when encountering the signal of the rising edge of the original signal.



(b) Forward home return: deceleration point and home point are forward limit switches (P03.41 = 2)

① Positive limit switch (deceleration point) is invalid (0 - invalid, 1 - valid) before the motor returns to the home position

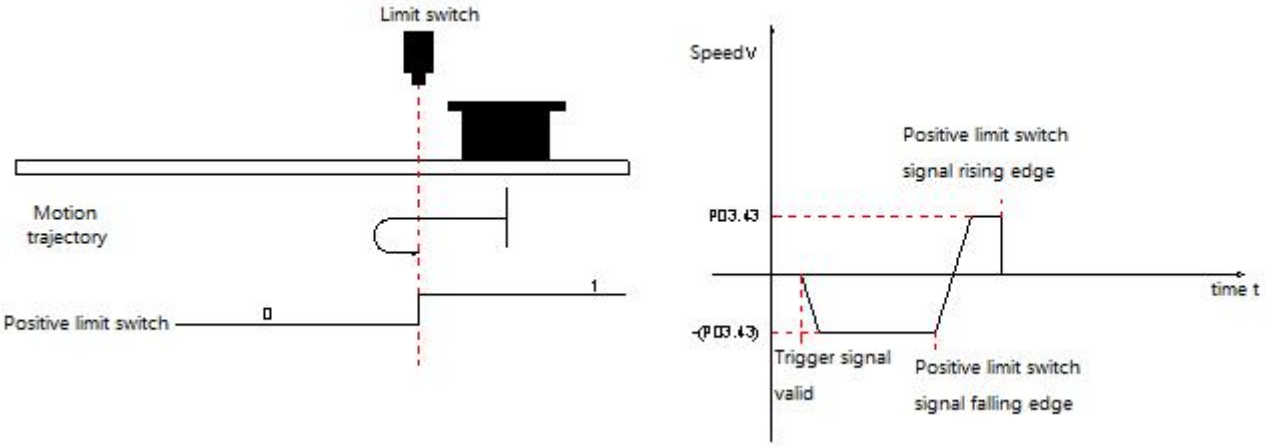
The motor first searches for the deceleration point signal in the forward direction at the value set in P03.42 (speed of searching for the home switch signal at high speed) until it encounters the rising edge of the deceleration point. After decelerating to 0 according to the deceleration time set in P03.44 (acceleration/deceleration time constant for searching the home switch signal), the motor accelerates in the reverse direction to the value set in -P03.43 (speed for searching the home switch signal at low speed) and searches for the deceleration point signal falling edge at low speed. When it encounters the falling edge of the deceleration point signal, it will decelerate to stop and stop, and then continue to search for the rising edge of the deceleration point in the low-speed forward direction with the set value of P03.43. During forward acceleration or forward uniform speed operation, will stop immediately when it encounters the rising edge signal of the positive limit switch signal.



② Positive limit switch (deceleration point) is valid (0 - invalid, 1 - valid) before the motor returns to the home position

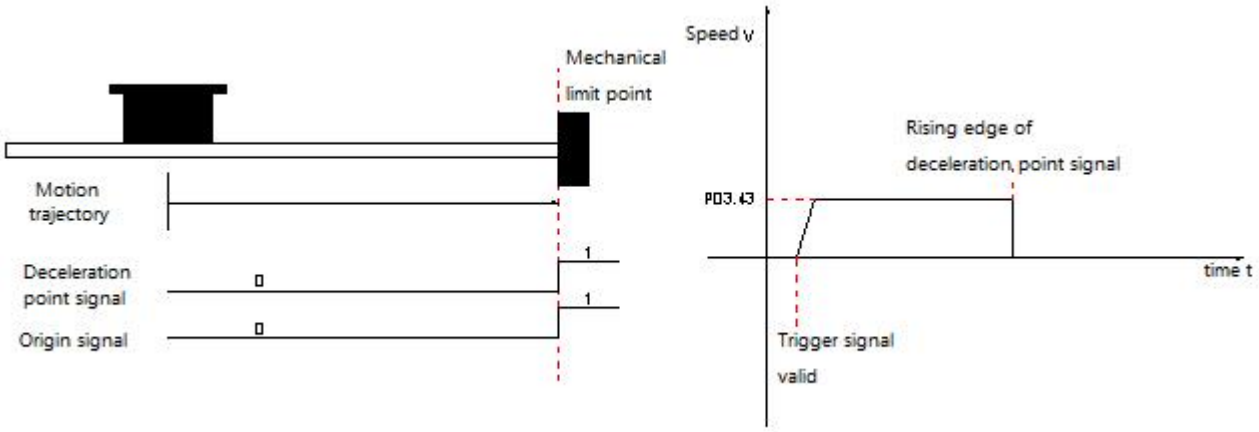
The motor directly searches for the falling edge of the deceleration point signal in the reverse direction at the set value of -P03.43 (low speed search for the origin switch signal), and immediately decelerates to stop when it encounters the falling edge of the deceleration point signal, and then continues to search for the rising edge of the deceleration point signal in the forward direction with the set value of P03.43, and stops immediately when it

encounters the rising edge of the forward limit switch signal during positive acceleration or uniform speed operation.



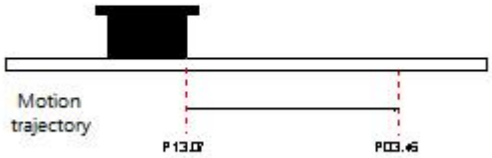
(c) Forward return home: deceleration point and home position are mechanical limit positions (P03.41 = 4)

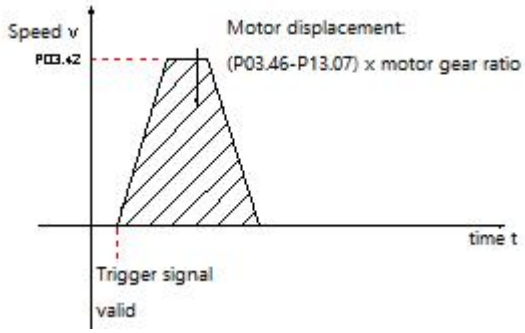
The motor first runs at low speed in the positive direction with the set value of P03.43 (speed of low-speed search home switch signal), and after collision to the mechanical limit position, if the motor torque reaches P03.52 (trigger stop and return to zero torque limit) and the actual motor speed is lower than P03.51 (the threshold value for the judgment of the return-to-zero speed when the stop is triggered), and this state is maintained for a certain time P03.50 (the threshold for the judgment of the return-to-zero time when the stop is reached), it is judged that the motor runs to the mechanical limit position and stops immediately.



（3） Electrical return to zero

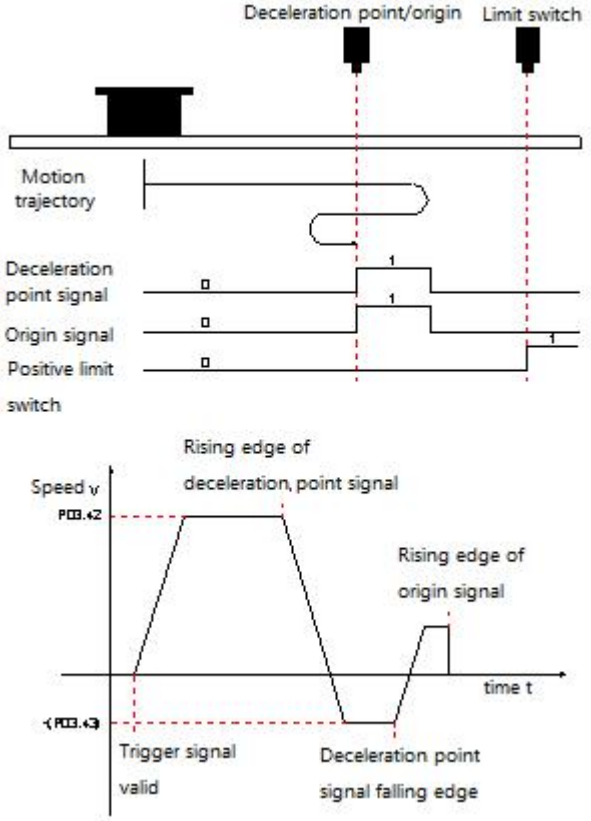
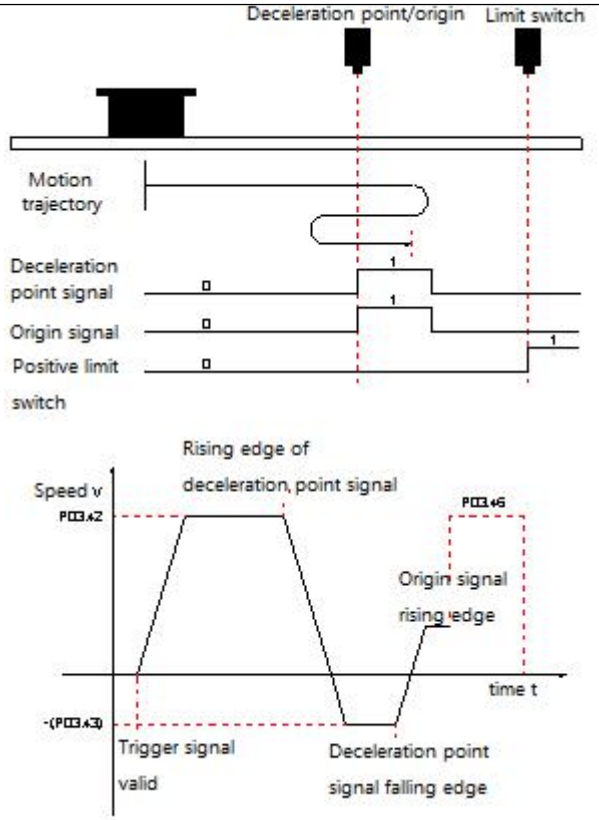
The mechanical zero position of the system is known after the motor has undergone a mechanical zero return operation. At this time, after setting P03.46/P03.47, the motor can be moved from the current position (P13.07/P13.08) to the specified position (P03.46/P03.47). In the electrical return to zero mode, the motor runs at high speed at the set value of P03.42 (speed of high-speed search home switch signal) throughout the entire process, and the total motor displacement is determined by the difference between P13.07/P13.08 and P03.46/P03.47, and the running direction is determined by the positive or negative of the total motor displacement. After the displacement command is completed, the motor will stop.





（4） Mechanical origin and mechanical zero point

Take P03.41=0 as an example to illustrate the difference between mechanical origin and mechanical zero point:

The mechanical origin does not coincide with the mechanical zero point	The mechanical origin coincides with the mechanical zero point
If the home position offset (P03.46/P03.47) is set and the mechanical origin does not coincide with the mechanical zero point (P03.49 = 0/2), during forward acceleration or forward uniform operation, the motor stops immediately after encountering the rising edge of the home position signal. And the current position of the motor P13.07/P13.08 is forced to the set value of P03.46/P03.47 after stopping.	If the home position offset (P03.46/P03.47) is set and the mechanical origin coincides with the mechanical zero point (P03.49 = 1/3), the motor stops immediately after encountering the rising edge of the home position signal during forward acceleration or forward uniform speed operation. After that, the motor stops after running the stroke of the set value P03.46/P03.47. At this time, the current position of the motor P13.07/P13.08 and the set value of P03.46/P03.47 are the same.
	

4.2 Speed control mode

Set the value of parameter P01.00 to 1, to enable the driver to work in speed control mode.

4.2.1 Speed command input setting

In speed control mode, the source of speed command should be set by parameter P04.00 first.

★ Description of related parameters

Parm	Name	Setting range	Function	Setting method	Effective time	Factory setting
P04.00	Speed command source selection	0: Digital given 1：Multi-segment speed command 2：Communication control 3：IO control 4：Analog control (reserved) 5～10：Reserved	Set the source of speed commands in speed control mode	Set after stopping	Effective immediately	0

a) Speed command source is digital given (P04.00=0)

★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P04.01	Speed command digital given value	-6000～6000	rpm	Set the maximum speed of motor operation **Speed is a signed value, a positive number means positive rotation, a negative number means reverse rotation**	Set when running	Effective immediately	1000
P04.05	Speed command acceleration time constant	1～65535	ms	Set the time for the motor speed to uniformly accelerate from 0rpm to 1000rpm	Set when running	Effective immediately	200
P04.06	Speed command deceleration time constant	1～65535	ms	Set the time for the motor speed to decelerate uniformly from 1000rpm to 0rpm	Set when running	Effective immediately	200
P01.33	Emergency stop deceleration time constant	1～65535	ms	Set the time for the motor speed to uniformly decelerate from 1000rpm to 0rpm during emergency stop	Set when running	Effective immediately	30

The start-up operation mode is as follows:

1、The motor starts to run when the servo is enabled, that is, the driver start and stop are controlled by the driver enable signal.

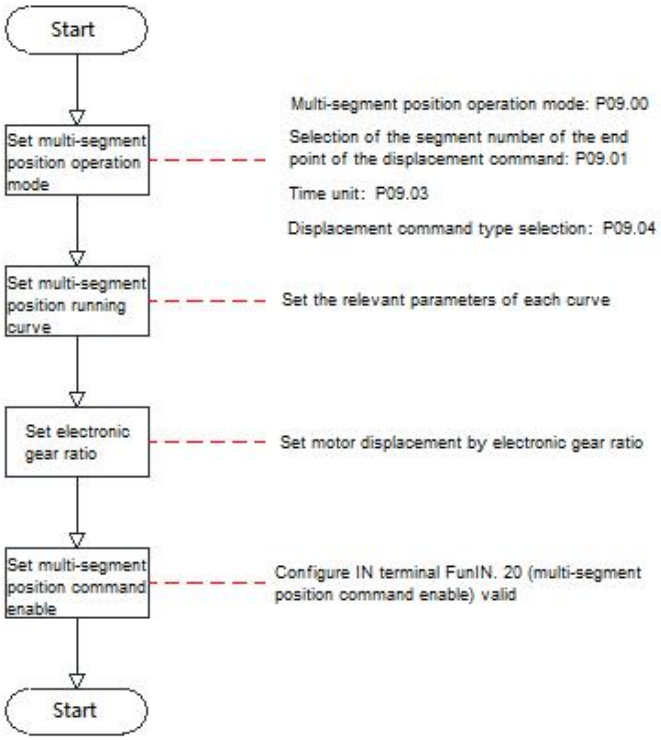
- The motor can modify the running speed through communication during operation, and it will take effect immediately;

- When the motor encounters a limit or emergency stop input, it will decelerate to stop according to the emergency stop deceleration time constant set by P01.33. And after stopping, even if the limit or emergency stop input signal becomes invalid, the motor will not start to run, and it must be re-enabled to trigger the motor's operation;
- The motor can select the running direction by setting the input terminal function to "FunIN.19 (speed command direction setting)". The actual running direction of the motor is as follows:

P01.01 (Rotation direction selection)	P04.01 (Speed command digital given value)	Speed command direction setting	The actual running speed of the motor
0	+	invalid	CCW
	+	valid	CW
	-	invalid	CW
	-	valid	CCW
1	+	invalid	CW
	+	valid	CCW
	-	invalid	CCW
	-	valid	CW

b) Speed command source is multi-segment speed command (P04.00=1)

The servo driver has the function of multi-segment speed operation. It means that there are 16 speed commands stored inside the servo driver, and the maximum operating speed and operating time of each segment can be set separately. And equipped with 7 groups of acceleration and deceleration time to choose from. The setting process is as follows:



① Set multi-speed operation mode

★ Description of related parameters

Parm	Name	Setting range	Function	Setting method	Effective time	Factory setting
P10.00	Multi-segment speed command operation method	0: stop at the end of a single operation 1: Cycle operation 2: Switch through the external IN port	Set multi-speed command operation mode	Set when running	Next run	1
P10.01	Number of speed command end segments	1～16	Set the number of segments required for a multi-step speed command	Set when running	Next run	16
P10.02	Unit of running time	0：ms 1：s	Selects the unit of multi-segment speed command running time	Set when running	Next run	0

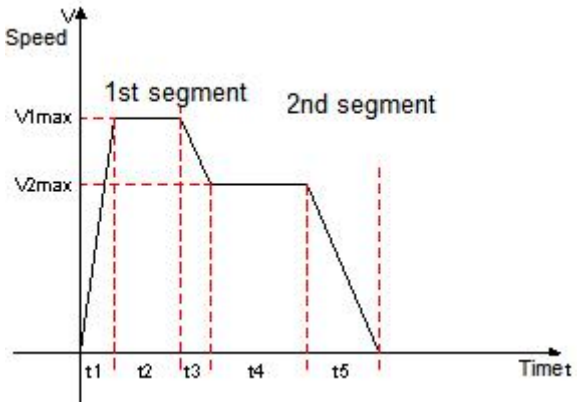
The external IN terminal can be configured with the function FunIN.19 (speed command direction setting) for multi-segment operation command direction selection.

Code	Function name	Function
FunIN.19	Speed command direction setting	Invalid: default command direction Valid: the opposite direction of the command

Take P10.01=2 as an example to illustrate each mode:

- Stop at the end of a single operation (P10.00=0)

P10.00 is set to 0 and the single run end stop mode is selected. After setting parameters P10.01 and P10.02 respectively according to the total number of executed segments and execution time units, and setting parameters such as command value, running time and acceleration/deceleration time of the corresponding segment according to the demand, the driver will run from segment 1 to segment N according to the segment code until it stops after running the last segment.

Mode description	Running curve
• Run 1 round; • The segment number is automatically incremented and switched;	 V_{1max}、V_{2max}：Command speed of the 1st and 2nd segment

	t_1：The actual acceleration and deceleration time of the first segment; t_3、t_5：The actual acceleration and deceleration time of the second segment; A certain period of running time: the shifting time of the previous speed command switching to this speed command + the constant speed running time of this segment(for example: the running time of the first segment in the figure is t1+t2, and the running time of the second segment is t3+t4. And so on) When a certain period of running time is set to 0, the driver will skip this segment speed command and execute the next segment.

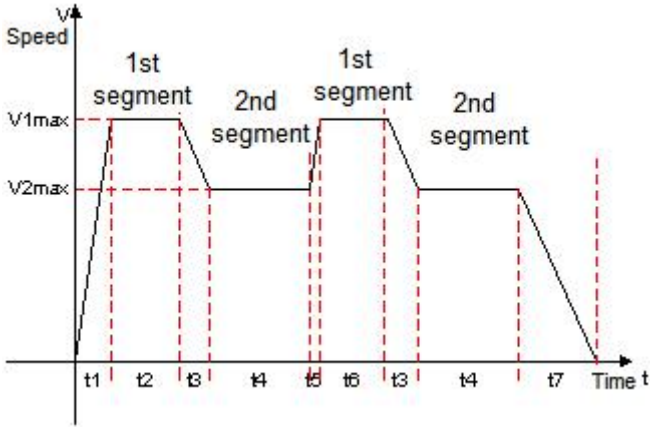
★ Term explanation:

The total number of multi-segment speed commands set by P10.01 when the driver completes one run is called the completion of one round of operation.。

- Cycle operation (P10.00=1)

P10.00 is set to 1, and the cycle operation mode is selected.

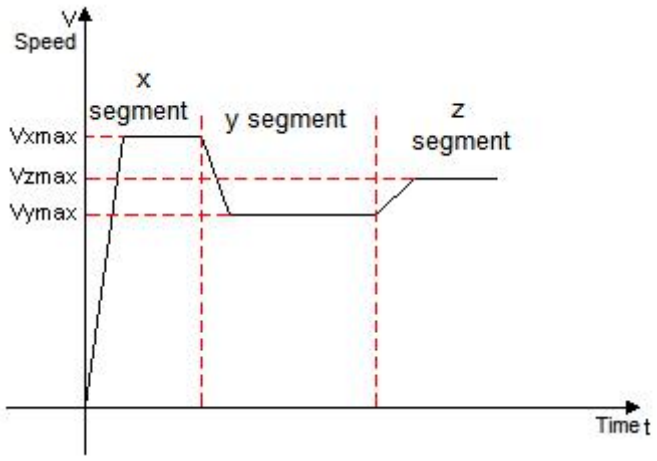
After setting the parameters P10.01 and P10.02 according to the total number of execution segments and execution time unit, and set the command value, running time and acceleration/deceleration time of the corresponding segment according to the requirements, the module will run time and acceleration/deceleration time according to the commands of each segment. The drive will run according to the speed segment from the 1st segmentto the Nth segment, and automatically jump to the 1st segmentfor cyclic operation after the last segment.

Mode description	Running curve
• Cycle operation, the starting segment number of each round is 1; • The segment number is automatically incremented and switched; • If the servo enable is valid, the cycle running state will always be maintained.	 V_{1max}、V_{2max}：Command speed of the 1st and 2nd segment A certain period of running time: the shifting time of the previous speed command switching to this speed command + the constant speed running time of this segment(for example: the running time of the first segment in the figure is t1+t2, and the running time of the second segment is t3+t4. And so on) When a certain period of running time is set to 0, the driver will skip this segment speed command and execute the next segment.

- Switch through the external IN port (P10.00=2)

P10.00 is set to 2 to select the external IN port switching mode.

After setting the P10.01 parameter according to the total number of execution segments, and set the corresponding segment command value, running time, acceleration and deceleration time and other parameters according to the requirements,the driver will select the speed command value of the corresponding segment number according to the ON/OFF combination of external IN (multi-segment operation command switch x).

Mode description	Running curve
● If the segment number is updated, it can run continuously; ● The segment number is determined by the IN terminal logic ● The interval time between segments is determined by the command delay of the host computer; ● If the servo enable is valid, the cycle running state will always be maintained.	 x, y: segment number, the logical relationship between segment number and IN terminal is as follows; The running time of a certain segment is not affected by the parameter setting value. During the speed command operation of a certain segment, if the segment number changes, it will immediately switch to the new segment number to run;

When the multi-segment position operation mode is set to IN switching operation, please configure the 4 IN terminals of the driver as functions 14～17 (FunIN.14～FunIN.17：multi-segment operation command switching), and confirm the valid logic of IN terminal.At the same time, one IN terminal of the servo driver can be configured as function 19 (FunIN.19: speed command direction setting) to switch the speed command direction.

<table>
<tr><th>Code</th><th>Name</th><th>Function name</th><th>Function</th></tr>
<tr><td>FunIN.14</td><td>CMD1</td><td>Multi-segment operation command switching 1</td><td rowspan="4">The multi-segment segment number is a 4-digit binary number, and the corresponding relationship between CMD1 ～ CMD4 and the segment number is as follows:
<table>
<tr><th>CMD4</th><th>CMD3</th><th>CMD2</th><th>CMD1</th><th>Segment number</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>2</td></tr>
<tr><td colspan="5">……</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>15</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>16</td></tr>
</table></td></tr>
<tr><td>FunIN.15</td><td>CMD2</td><td>Multi-segment operation command switching 2</td></tr>
<tr><td>FunIN.16</td><td>CMD3</td><td>Multi-segment operation command switching 3</td></tr>
<tr><td>FunIN.17</td><td>CMD4</td><td>Multi-segment operation command switching 4</td></tr>
<tr><td>FunIN.19</td><td>DIR-SEL</td><td>Speed command direction setting</td><td>In multi-segment IN switching operation mode, used to set the speed command direction
Invalid: keep the original command direction
Effective: speed command direction</td></tr>
</table>

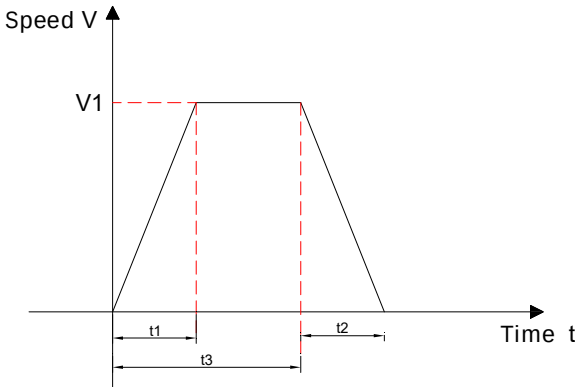
② Set multi-speed operation curve

Take the first stage speed command as an example, the relevant parameters are as follows:

★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P10.03	Acceleration time constant 1	1～65535	ms	Set the first group acceleration and deceleration time constant	Set when running	Effective immediately	200
P10.04	Deceleration time constant 1	1～65535	ms		Set when running	Effective immediately	200
P10.15	Acceleration time constant 7	1～65535	ms	Set the 7th group acceleration and deceleration time constant	Set when running	Effective immediately	200
P10.16	Deceleration time constant 7	1～65535	ms		Set when running	Effective immediately	200
P10.20	The first segment speed command	-6000～6000	rpm	Set the first segment speed command value	Set when running	Effective immediately	100
P10.21	The first segment speed command running time	0～65535	0.1sec 0.1min	Set the first segment command running time	Set when running	Effective immediately	10
P10.22	The first segment speed command acceleration and deceleration time constant selection	1～7	-	Select the first segment acceleration and deceleration mode	Set when running	Effective immediately	1

There are 7 groups of acceleration and deceleration time for selection in the multi-segment speed command parameters, except for the 1 to 16 segments of command value and command running time. The default mode is acceleration and deceleration time constant 1. In the multi-segment speed, P10.00=1, the end of a single operation is taken as an example, and the actual acceleration and deceleration time and running time are explained:



As shown in the figure above, the speed command of this segment is V1, and the actual acceleration time t1 is:

$$t_1 = \frac{V_1}{1000} \times The\ acceleration\ time\ of\ the\ speed\ setting$$

Actual deceleration time t2:

$$t_2 = \frac{V_1}{1000} \times The\ deceleration\ time\ of\ this\ speed\ setting$$

Running time: the shift time when the previous speed command is switched to this speed command + the constant speed running time of this segment, as shown in t3 in the figure.

c) The speed command source is the communication control speed command (P04.00=2)

★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P04.60 P04.61	Number of communication command pulses	0～1073741824	Command unit	Set the number of command pulses for communication control operation	Set when running	Effective immediately	50000
P04.62	Communication control speed	0～6000	rpm	Set the maximum speed for communication control operation	Set when running	Effective immediately	1000
P04.63	Communication control acceleration time constant	1～65535	ms	Set the time for the motor speed to uniformly accelerate from 0rpm to 1000rpm	Set when running	Effective immediately	200
P04.64	Communication control deceleration time constant	1～65535	ms	Set the time for the motor speed to uniformly decelerate from 1000rpm to 0rpm	Set when running	Effective immediately	200
P04.65	Internal demo operation mode	0～1	-	Set the operation mode of internal demo operation 0: Motor reciprocating 1: Motor runs in one direction	Set when running	Effective immediately	0
P04.66	Internal demo start running direction	0～1	-	Set the starting direction of the internal demo run 0: positive direction 1: negative direction	Set when running	Effective immediately	0
P04.67	Number of internal demo runs	0～65535	-	Set the number of runs of internal demo run	Set when running	Effective immediately	0
P12.10	Communication control start/stop command	0～6	-	Start/stop command for driver communication operation	Set when running	Effective immediately	6
P12.12	Internal demo waiting time	0～65535	ms	Set the waiting time for the internal demo operation	Set when running	Effective immediately	100
P12.13	Internal demo start/stop command	0～2	-	Start /stop command for the internal demo operation of the driver	Set when running	Effective immediately	0
P01.33	Emergency stop deceleration time constant	1～65535	ms	Set the time for the motor speed to uniformly decelerate from 1000rpm to 0rpm during emergency stop	Set when running	Effective immediately	30

The startup method is as follows:

3. The motor works in the communication control mode: write the start and stop commands for operation through P12.10, and the motor will run in accordance with the operation curve determined by the command stroke, speed and acceleration/deceleration time constant set by P04.60～P04.64.

Value written in P12.10	Description
0	Write: trigger motor to decelerate to stop. After the motor responds to the start-stop command, set P12.10 to 6;
1	Write: trigger the motor to run forward of the operation command set by P04.60 and then stop. After the motor responds to the start-stop command, set P12.10 to 6;
2	Write: trigger the motor to run reversely of the operation command set by P04.60 and then stop. After the motor responds to the start-stop command, set P12.10 to 6;
3	Write: trigger the motor to jog forward. After the motor responds to the start-stop command, set P12.10 to 6;
4	Write: trigger the motor to jog reverse. After the motor responds to the start-stop command, set P12.10 to 6;
5	Write: trigger motor emergency stop. After the motor responds to the start-stop command, set P12.10 to 6;
6	Write: meaningless; Read: indicating that the motor is running or waiting to be triggered to run;

4. The motor works in cyclic operation (demonstration) mode: write the start and stop instructions of the demonstration through P12.13. In the demo running mode, the motor will start in reciprocating or single direction (P04.65=0/1) according to the running command, speed, acceleration and deceleration time constant set by P04.60～P04.64, and start in positive or negative direction (P04.66=0/1), run the number of times set by P04.67. After completing the set running command each time and setting the delay time by P12.12, restart again and run in this cycle.

Value written in P12.13	Description
0	Write: stop the operation of the demo mode; read: indicate that the motor is waiting to be triggered to run;
1	Write: start the operation of the demo mode; set P12.13 to 2 after the motor responds to the start-stop command;
2	Write: meaningless; Read: means that the motor is working in demo mode;

d) The speed command source is IO jog (P04.00=3)

★ Description of related parameters

Parm	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P04.16	IO jog forward speed	0～6000	rpm	Set the maximum speed of the motor running forward	Set when running	Effective immediately	200
P04.17	IO jog reversal speed	0～6000	rpm	Set the maximum speed of the motor running in reverse	Set when running	Effective immediately	200
P04.18	IO jog	1～65535	ms	Set the time for the motor speed to	Set when	Next run	100

	acceleration time constant			uniformly accelerate from 0rpm to 1000rpm	running		
P04.19	IO jog deceleration time constant	1～65535	ms	Set the time for the motor speed to uniformly decelerate from 1000rpm to 0rpm	Set when running	Next run	100
P01.33	Emergency stop deceleration time constant	1～65535	ms	Set the time for the motor speed to uniformly decelerate from 1000rpm to 0rpm during emergency stop	Set when running	Effective immediately	30

The startup method is as follows:

1. The motor works in: start-stop + direction mode

Set the function of the input terminal to control the motor, assuming that IN3 controls the start and stop of the motor, and IN4 controls the direction of the motor:

Code	Name	Function name	Function
FunIN.24	USER1	Motor start and stop	IN3 is used to control the start and stop of the motor: Pn02.04=24 Normally open polarity (when IN3 is connected to 0V, the motor will start, and when IN3 is connected to 24V, the motor will stop): Pn02.05=0 Normally closed polarity (the motor stops when IN3 is connected to 0V, and the motor starts when IN3 is connected to 24V): Pn02.05=1
FunIN.19	DIR-SEL	Speed command direction setting	IN4 is used to control the running direction of the motor: Pn02.06=19 Normally open polarity (when IN4 is connected to 0V, the motor is reversed, when IN4 is connected to 24V, the motor is forward): Pn02.07=0 Normally closed polarity (when IN4 is connected to 0V, the motor rotates forward, when IN4 is connected to 24V, the motor reverses): Pn02.07=1

The actual running direction of the motor is as follows:

P01.01(Rotation direction selection)	Speed command direction setting	The actual running speed of the motor
0	invalid	CCW
	valid	CW
	invalid	CW
	valid	CCW
1	invalid	CW
	valid	CCW
	invalid	CCW
	valid	CW

2. The motor works in: forward rotation + reverse rotation mode

Set the function of the input terminal to control the motor, assuming that IN3 controls the motor to rotate forward, and IN4 controls the motor to reverse:

Code	Name	Function name	Function
FunIN.25	USER2	Motor forward	IN3 is used to control the start and stop of the motor: Pn02.04=25 Normally open polarity (when IN3 is connected to 0V, the motor rotates forward, when IN3 is connected to 24V, the motor stops): Pn02.05=0 Normally closed polarity (when IN3 is connected to 0V, the motor stops,

			when IN3 is connected to 24V, the motor rotates forward): Pn02.05=1
FunIN.26	USER3	Motor reverse	IN4 is used to control the running direction of the motor: Pn02.06=26 Normally open polarity (when IN4 is connected to 0V, the motor reverses, and when IN4 is connected to 24V, the motor stops): Pn02.07=0 Normally closed polarity (the motor stops when IN4 is connected to 0V, and the motor reverses when IN4 is connected to 24V): Pn02.07=1

Note: The motor will not respond to the speed start and stop command in the other direction during operation. For example: the motor is rotating forward at this time, even if the reverse signal is valid at this time, the motor will continue to rotate forward. If you really need to reverse, please cancel the forward signal first, and then input the reverse signal.

3. During the operation of the motor, the motor speed can be modified in real time by means of communication, and the driver can respond immediately.

4.3 **Torque Control Mode**

4.3.1 Torque command input setting

In the torque control mode, the speed command source should first be set via parameter P05.00.

★ Related parameter description

Parameter	Name	Setting range	Function	Setting method	Effective time	Factory setting
P05.00	Torque command source A	0～2	Set the command source of torque command source A 0: Digital setting (P05.03) 1: Analog channel AI1 (reserved) 2: Analog channel AI2 (reserved)	Set after stopping	Effective immediately	0
P05.01	Torque command source B	0～2	Set the command source of torque command source B 0: Digital setting (P05.03) 1: Analog channel AI1 (reserved) 2: Analog channel AI2 (reserved)	Set after stopping	Effective immediately	0
P05.02	Torque command source	0～3	Set the torque command source in torque mode 0: Torque command is set by command source A 1: Torque command is set by command source B 2: Torque command is given by (P05.20) communication 3: Torque command is combined by command source A/B (reserved)	Set after stopping	Effective immediately	0

a) Torque operating mode 1

In this working mode, the positive and negative symbols of the torque command are used to realize the forward and reverse operation of the motor torque mode, and there is no acceleration and deceleration control process for the operation of the motor. This function requires P05.26 to be set to 0.

★ Related parameter description

Parameter	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P05.03	Digital given	-3000～3000	0.1%	When the command source P05.00/P05.01 is set to 0 (when digital is given), set the torque value for torque mode operation	Set when running	Next run	200
P05.05	Torque ramp	1～65535	0.1%/s	Set the unit time increment of torque command	Set when running	Next run	3000
P05.12	Speed limit source	0～1	-	Set the maximum speed limit source in torque mode 0：Internal setting (P05.14/P05.15) 1：External analog quantity (reserved)	Set when running	Next run	0
P05.14	Torque control forward speed limit value	0～6000	rpm	Set the forward speed limit value in torque control mode	Set when running	Next run	3000
P05.15	Torque control negative speed limit value	0～6000	rpm	Set the negative speed limit value in torque control mode	Set when running	Next run	3000
P05.16	Torque reaches the reference value	0～65535	0.1%	Set the reference value of the motor torque when the running torque reaches the signal output	Set when running	Next run	0
P05.17	Torque reaches the effective value	0～65535	0.1%	Set the effective value of the motor torque when the running torque reaches the signal output	Set when running	Next run	100
P05.18	Torque reaches invalid value	0～65535	0.1%	Set the invalid value of the motor torque when the running torque reaches the signal output	Set when running	Next run	50
P05.19	Torque mode torque arrival signal detection time	0～65535	ms	Set the torque detection time of the motor torque when the running torque reaches the signal output	Set when running	Next run	50
P05.20	Communication given torque command	0～3000	0.1%	When P05.02 is set to 3, set the torque command value in torque mode	Set when running	Next run	200
P05.26	Torque operation mode selection	0～1	-	Set the working mode of torque operation	Set after stopping	Next run	0

Starting mode: After the above-mentioned related parameters are set for the motor, the upper computer will give an enable signal, and the motor torque will run according to the set torque and speed limit values.

b) Torque operating mode 2

In this working mode, the motor accelerates and decelerates according to the set speed trajectory, and the speed curve of the motor operation is planned. After the motor torque is reached, the internal operation mode can be selected, such as free running state, continuing to maintain the set torque, etc.

★ Related parameter description

Parameter	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P05.03	Digital given	-3000～3000	0.1%	When the command source P05.00/P05.01 is set to 0 (when digital is given), set the torque value for torque mode operation	Set when running	Next run	200
P05.12	Speed limit source	0～1	-	Set the maximum speed limit source in torque mode 0：Internal setting (P05.14/P05.15) 1：External analog quantity (reserved)	Set when running	Next run	0
P05.14	Torque control forward speed limit value	0～6000	rpm	Set the forward speed limit value in torque control mode	Set when running	Next run	3000
P05.15	Torque control negative speed limit value	0～6000	rpm	Set the negative speed limit value in torque control mode	Set when running	Next run	3000
P05.16	Torque reaches the reference value	0～65535	0.1%	Set the reference value of the motor torque when the running torque reaches the signal output	Set when running	Next run	0
P05.17	Torque reaches the effective value	0～65535	0.1%	Set the effective value of the motor torque when the running torque reaches the signal output	Set when running	Next run	100
P05.18	Torque reaches invalid value	0～65535	0.1%	Set the invalid value of the motor torque when the running torque reaches the signal output	Set when running	Next run	50
P05.19	Torque mode torque arrival signal detection time	0～65535	ms	Set the torque detection time of the motor torque when the running torque reaches the signal output	Set when running	Next run	50
P05.20	Communication given torque	0～3000	0.1%	When P05.02 is set to 3, set the torque command value in	Set when	Next run	200

	command			torque mode	running		
P05.21	Torque running acceleration time constant	1～65535	ms	Set the time for the motor speed to accelerate uniformly from 0rpm to 1000rpm	Set when running	Next run	100
P05.22	Torque running deceleration time constant	1～65535	ms	Set the time for the motor speed to decelerate uniformly from 1000rpm to 0rpm	Set when running	Next run	100
P05.23	Torque mode torque holding time	0～65535	ms	Set the torque holding time after the motor torque reaches the effective signal output 0: the motor holds the torque and waits for the upper computer to control the shutdown Other values: After the motor holding torque reaches the time set in P05.23, it will stop automatically	Set when running	Next run	500
P05.24	Torque mode shutdown mode	0～4	-	Set the operating mode after torque stop in torque control mode: 0：Motor running torque is set to 0 (offline) Other：Do not deal with	Set when running	Next run	0
P05.25	Torque mode communication start-stop command	0～2	-	Used for communication to trigger the start and stop of the motor torque mode, or for software to force the motor torque to run in forward and reverse rotation (at this time, the motor start/stop is only controlled by the servo enable signal) 0：Stop 1：Forward start operation 2：Reverse start operation	Set when running	Effective immediately	0
P05.26	Torque operation mode selection	0～1	-	Set the working mode of torque operation	Set after stopping	Next run	0

There are two ways to start up as follows:

1、Set the corresponding IN terminal function to "FunIN.24 (torque forward)", "FunIN.25 (torque reverse)" P02 group: terminal input/output parameters and set the correct polarity according to the external IN terminal. Use external input to trigger torque mode operation (trigger signal is level effective).

2、Write a specific value to P05.25 through communication:

Value written in P05.25	Description
0	Write: Torque operation stops; Read: indicates that the motor is in stop or has been stopped;
1	Write: Motor starting torque forward operation; Read: the motor is running torque forward
2	Write: Motor starting torque reverse operation；Read：the motor is in torque reversal operation;

- In communication mode, when the motor torque is running, if you want to switch the running direction, you must first write 0 to trigger the motor to stop, then write the running start value in the opposite direction (1/2);
- It is recommended not to mix the external input trigger control and communication trigger control, otherwise there may be abnormal conditions.

4.3.2 Speed limit in torque mode

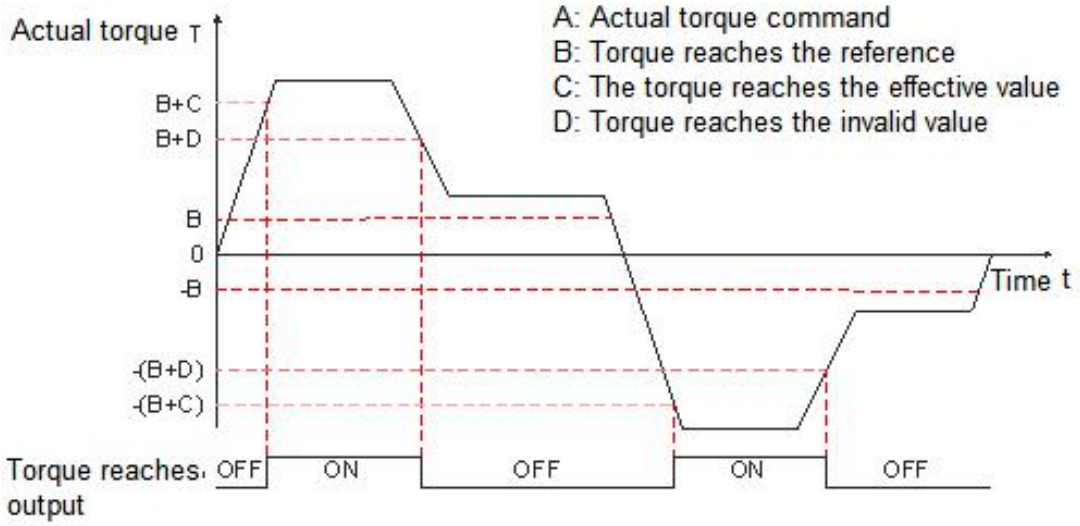
In the torque control mode, if the given torque command is too large and greater than the mechanical side load torque, the motor will continue to accelerate, overspeed may occur, and the mechanical equipment may be damaged. Therefore, in order to protect the machine, the speed of the motor must be limited.

★ Related parameter description

Parameter	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P05.14	Torque control forward speed limit value	0～6000	rpm	Set the forward speed limit value in torque control mode	Set when running	Next run	3000
P05.15	Torque control negative speed limit value	0～6000	rpm	Set the negative speed limit value in torque control mode	Set when running	Next run	3000

4.3.3 Torque arrival output

The torque arrival function is used to determine whether the actual torque command has reached the set interval. When the actual torque command reaches the torque command threshold, the driver can output the corresponding output signal (torque arrival) for the host computer to use the input/output parameters. P02 group: terminal input/output parameters



Actual torque command (P13.03 parameter value can be read by communication):

When the torque reaches the output signal from invalid to active, the actual torque command must satisfy:

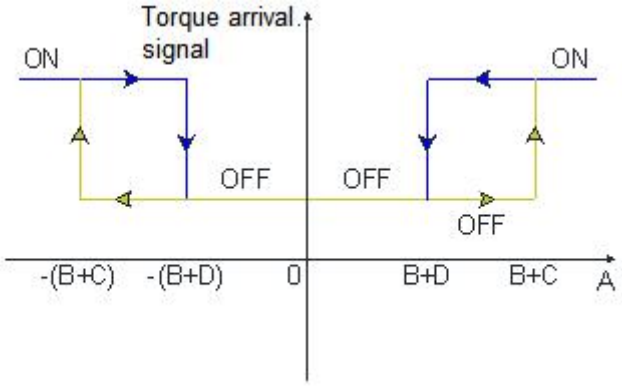
$$|A| \geq B + C$$

Otherwise, the torque arrival output signal remains inactive.

Conversely, when the torque arrival signal changes from a valid value to an invalid value, the actual torque command must satisfy:

$$|A| < B + D$$

Otherwise, the torque arrival output signal remains active.



★ Related parameter description

Parameter	Name	Setting range	Unit	Function	Setting method	Effective time	Factory setting
P05.17	Torque reaches the effective value	0～65535	0.1%	Set the effective value of the motor torque when the running torque reaches the signal output	Set when running	Next run	100
P05.18	Torque reaches invalid value	0～65535	0.1%	Set the invalid value of the motor torque when the running torque reaches the signal output	Set when running	Next run	50
P05.19	Torque mode	0～65535	ms	Set the torque detection time of	Set	Next run	50

	torque arrival signal detection time			the motor torque when the running torque reaches the signal output	when running		

4.4 **Hybrid control mode**

The hybrid control mode means that when the servo enable bit is ON and the servo state is running, the working mode of the servo driver can be switched between different control modes.

There are four main types of mixed control modes:

- Speed mode – Torque mode
- Position mode – Speed mode
- Position mode – Torque mode
- Position mode – Speed mode – Torque mode

Set by parameter P01.00 (control mode selection), as shown in the following table:

★ Related parameter description

Parameter	Name	Setting range	Function	Setting method	Effective time	Factory setting
P01.00	Control mode selection	0：Position control mode 1：Speed control mode 2：Torque control mode 3：EtherCAT/CANopen mode 4：Speed mode – Torque mode 5：Position mode – Speed mode 6：Position mode – Torque mode 7：Position mode – Speed mode – Torque mode	Set the control mode of the servo driver	Set after stopping	Effective immediately	0

When P01.00 is set to 4/5/6, please configure an IN terminal of the servo driver as function 10 (FunIN.10: control mode selection 1), and determine the effective logic level value of the IN terminal.

When P01.00 is set to 7, please configure the two IN terminals of the servo driver as function 10 (FunIN.10: control mode selection 1) and function 29 (FunIN.29: control mode selection 2) respectively. And determine the effective logic level of these two IN terminals.

★ Associated function code

<table>
<tr><th>Code</th><th>Name</th><th>Function</th></tr>
<tr><td>FunIN.10</td><td>Control mode selection 1</td><td>Used to set the current control mode of servo driver in mixed control mode:
<table>
<tr><th>P01.00</th><th>FunIN.10 logic</th><th>Control model</th></tr>
<tr><td rowspan="2">4</td><td>Invalid</td><td>Speed control mode</td></tr>
<tr><td>Effective</td><td>Torque control mode</td></tr>
<tr><td rowspan="2">5</td><td>Invalid</td><td>Position control mode</td></tr>
<tr><td>Effective</td><td>Speed control mode</td></tr>
<tr><td rowspan="2">6</td><td>Invalid</td><td>Position control mode</td></tr>
<tr><td>Effective</td><td>Torque control mode</td></tr>
</table></td></tr>
<tr><td>FunIN.29</td><td>Control mode selection 2</td><td>Used to set the current control mode of servo driver in mixed control mode:
<table>
<tr><th>P01.00</th><th>FunIN.29 logic</th><th>FunIN.10 logic</th><th>Control model</th></tr>
<tr><td rowspan="3">7</td><td>Invalid</td><td>Invalid</td><td>Position control mode</td></tr>
<tr><td>Invalid</td><td>Effective</td><td>Speed control mode</td></tr>
<tr><td>Effective</td><td>-</td><td>Torque control mode</td></tr>
</table></td></tr>
</table>

Chapter 5 Parameter Description

Parameter group	Parameter group description
P00	Servo driver/motor parameters
P01	Basic control parameters
P02	Terminal input/output parameters
P03	Position control parameters
P04	Speed control parameters
P05	Torque control parameters
P06	Gain parameters
P08	Communication parameters
P09	Multi-segment position parameters
P10	Multi-segment speed parameters
P13	Monitoring parameter groups

5.1 Group P00: Servo driver/motor parameters

P00.00	Name	Motor number			Related mode	-
	Setting range	10000～65535	Unit	-	Factory setting	50604

P00.01	Name	Servo driver model			Related mode	display
	Setting range	-	Unit	-	Factory setting	-

Display servo driver model

Display value	Description
0x42(66)	DRV400E
0x43(67)	DRV750E
0x45(69)	DRV1500E
0x52(66)	DRV400
0x53(67)	DRV750
0x55(69)	DRV1500
0x62(66)	DRV400C
0x63(67)	DRV750C
0x65(69)	DRV1500C

P00.02	Name	MCU software version number			Related mode	display
	Setting range	XXX.YY	Unit	-	Factory setting	-

P00.03	Name	FPGA software version			Related mode	display
	Setting range	XXX.YY	Unit	-	Factory setting	-

P00.04	Name	EtherCAT software version			Related mode	display
	Setting range	XXX.YY	Unit	-	Factory setting	-

P00.05	Name	Driver hardware version			Related mode	display
	Setting range	XXX.YY	Unit	-	Factory setting	-

P00.06	Name	CAN software version			Related mode	display
	Setting range	XXX.YY	Unit	-	Factory setting	-

P00.07	Name	Software non-standard ID			Related mode	display
	Setting range	-	Unit	-	Factory setting	-

P00.08	Name	Hardware non-standard ID			Related mode	display
	Setting range	-	Unit	-	Factory setting	-

P00.09	Name	Driver PWM update mode			Related mode	display
	Setting range	-	Unit	-	Factory setting	-

P00.17	Name	Rated power			Related mode	-
	Setting range	1～65535	Unit	0.01KW	Factory setting	-

P00.18	Name	Rated voltage			Related mode	-
	Setting range	1～380	Unit	V	Factory setting	-

P00.19	Name	Rated current			Related mode	-
	Setting range	1～65535	Unit	0.1A	Factory setting	-

P00.20	Name	Rated speed			Related mode	-
	Setting range	1～6000	Unit	rpm	Factory setting	-

P00.21	Name	Maximum speed			Related mode	-
	Setting range	1～6000	Unit	rpm	Factory setting	-

P00.22	Name	Rated torque			Related mode	-
	Setting range	1～65535	Unit	0.01Nm	Factory setting	-

P00.23	Name	Maximum torque			Related mode	-
	Setting range	1～65535	Unit	0.01Nm	Factory setting	-

P00.24	Name	Moment of inertia Jm			Related mode	-
	Setting range	1～65535	Unit	$kgcm^2$	Factory setting	-

P00.25	Name	Motor magnetic pole number			Related mode	-
	Setting range	2～360	Unit	pole pair	Factory setting	-

P00.26	Name	Stator resistance			Related mode	-
	Setting range	1～65535	Unit	0.001Ω	Factory setting	-

P00.27	Name	Stator inductance Lq			Related mode	-
	Setting range	1～65535	Unit	0.01mH	Factory setting	-

P00.28	Name	Stator inductance Ld			Related mode	-
	Setting range	1～65535	Unit	0.01mH	Factory setting	-

P00.29	Name	Linear back-EMF coefficient			Related mode	-
	Setting range	1～65535	Unit	0.01mV/rpm	Factory setting	-

P00.30	Name	Torque coefficient Kt			Related mode	-
	Setting range	1～65535	Unit	0.01Nm/Arms	Factory setting	-

P00.31	Name	Electric time constant Te			Related mode	-
	Setting range	1～65535	Unit	0.01ms	Factory setting	-

P00.32	Name	Mechanical time constant Tm			Related mode	-
	Setting range	1～65535	Unit	0.01ms	Factory setting	-

P00.34	Name	Encoder type			Related mode	-
	Setting range	0～4	Unit	-	Factory setting	-

Set the motor encoder type, please set this parameter correctly, otherwise the driver cannot work normally.

Set value	Encoder type
0	Reserved
1	Multi-turn absolute
2	Single-turn absolute
3	Reserved
4	Reserved

P00.35 P00.36	Name	Absolute encoder offset			Related mode	-
	Setting range	0～1073741824	Unit	P	Factory setting	0

P00.37	Name	Absolute encoder digit			Related mode	-
	Setting range	10～23	Unit	BIT	Factory setting	17

P00.38	Name	Number of incremental encoder pulses			Related mode	-
	Setting range	1000～65535	Unit	P/r	Factory setting	10000

P00.39	Name	Encoder Z phase signal offset			Related mode	-
	Setting range	0～65535	Unit	P	Factory setting	1250

P00.40	Name	Encoder U phase signal rising edge offset			Related mode	-
	Setting range	0～65535	Unit	P	Factory setting	0

P00.41	Name	Prohibit multi-turn encoder battery fault output			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

P00.42	Name	Multi-turn encoder multi-turn bits			Related mode	-
	Setting range	0～24	Unit	Bit	Factory setting	16

P00.43	Name	Driver power-on position calibration torque			Related mode	-
	Setting range	0～100	Unit	%	Factory setting	90
Refers to the magnitude of the torque when the driver performs position calibration by locking the motor at encoder type P00.34=3/4. The unit is the percentage of rated torque of the motor. This parameter is invalid when P00.34 is set to any other value.						

P00.44	Name	Set current position as mechanical zero point			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

In the absolute value system, the mechanical zero point is set by setting P00.44=1. The specific method is: The load moves to the mechanical zero point position through JOG, and then the current position is automatically set as the mechanical zero point by setting the parameter P00.44 as 1.

P00.45 P00.46	Name	Encoder single-turn value corresponding to the mechanical zero of the absolute value system			Related mode	-
	Setting range	0～16777216	Unit	P	Factory setting	0
In the absolute value system, it is used to save the current single-turn value of the motor encoder at the mechanical zero position. After P00.44 is set to 1, the driver will automatically update the current single-turn value of the encoder to P00.45/P00.46.						

P00.47 P00.48	Name	Encoder multi-turn value corresponding to the mechanical zero of the absolute value system			Related mode	-
	Setting range	-16777216～16777216	Unit	Turn	Factory setting	0
In the absolute value system, it is used to save the current multi-turn value of the motor encoder at the mechanical zero position. After P00.44 is set to 1, the driver will automatically update the current multi-turn value of the encoder to P00.47/P00.48.						

P00.49	Name	It is forbidden to use the absolute encoder position to update the current position command			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0
Whether it is forbidden to use the absolute encoder value to update the current position command P13.07						

P00.50 P00.51	Name	Divided output gear ratio numerator			Related mode	-
	Setting range	1～8388608	Unit	-	Factory setting	10000

P00.52 P00.53	Name	Divided output gear denominator			Related mode	-
	Setting range	1～8388608	Unit	-	Factory setting	131072

P00.54	Name	Exchange frequency division output AB phase pulse			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

P00.55	Name	Encoder EEPROM version number			Related mode	-
	Setting range	-	Unit	-	Factory setting	-

P00.56	Name	Rotation mode enable (frequency division output Z-phase signal width)			Related mode	-
	Setting range	0～1(1～65535)	Unit	-	Factory setting	0(8)

P00.57	Name	Frequency division output Z phase signal polarity			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

P00.58	Name	Frequency division output Z phase initialization mode			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

5.2 Group P01: Basic control parameters

P01.00	Name	Control mode selection			Related mode	-
	Setting range	0～7	Unit	-	Factory setting	0

Select the servo driver control mode.

Set value	Control mode
0	Position mode
1	Speed mode
2	Torque mode
3	EtherCAT/CANopen
4	Speed mode-Torque mode
5	Position mode-Speed mode
6	Position mode-Torque mode
7	Position mode-Speed mode-Torque mode

P01.01	Name	Rotation direction selection			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

Set the forward direction of motor rotation when observed from the motor output shaft.

Set value	Direction of rotation	Remark
0	Take the CCW direction as the forward direction	In the case of a forward command, from the side of the motor shaft, the motor rotation direction is the CCW direction, that is, the motor rotates counterclockwise.
1	Take the CW direction as the forward direction	In the case of a positive command, from the side of the motor shaft, the motor rotation direction is the CW

		direction, that is, the motor rotates clockwise.

P01.20	Name	The minimum value of braking resistance allowed by the driver			Related mode	display
	Setting range	-	Unit	Ω	Factory setting	-
Check the minimum value of braking resistance allowed by a certain model of driver, which is only related to the driver model.						

P01.21	Name	Built-in braking resistance power			Related mode	display
	Setting range	-	Unit	W	Factory setting	-
Check the built-in braking resistor power of a certain type of driver, it cannot be changed, it is only related to the servo driver model.						

P01.22	Name	Built-in braking resistance value			Related mode	display
	Setting range	-	Unit	Ω	Factory setting	-
Check the minimum value of braking resistance allowed by a certain model of driver, which is only related to the driver model.						

P01.23	Name	Resistance heat dissipation coefficient			Related mode	-
	Setting range	1～100	Unit	-	Factory setting	20
When setting and using a braking resistor, the heat dissipation coefficient of the resistor is valid for both built-in and external braking resistors. Please set this parameter according to the actual heat dissipation conditions of the resistor. Recommended value: generally, when natural cooling, P01.23 does not exceed 30%; when forced air cooling, P01.23 does not exceed 50%.						

P01.24	Name	Braking resistance setting			Related mode	display
	Setting range	0: Use built-in braking resistor 1: Use external braking resistor	Unit	-	Factory setting	0

P01.25	Name	External braking resistance power			Related mode	-
	Setting range	1～65535	Unit	W	Factory setting	50

P01.26	Name	External braking resistance value			Related mode	-
	Setting range	1～1000	Unit	Ω	Factory setting	10

P01.27	Name	Braking start voltage value			Related mode	-
	Setting range	1～100	Unit	V	Factory setting	68

P01.28	Name	Brake feedback detection mode (Do not set)			Related mode	-
	Setting range	0～1(Do not set)	Unit	V	Factory setting	1

P01.29	Name	Maximum continuous braking time			Related mode	-
	Setting range	0～65535	Unit	ms	Factory setting	3000

P01.33	Name	Emergency stop deceleration time constant			Related mode	-
	Setting range	1～65535	Unit	ms	Factory setting	5
Set the time for the speed to change uniformly from 1000rpm to 0rpm when the motor stops suddenly.						

P01.36	Name	Servo enable delay off time			Related mode	-
	Setting range	0～65535	Unit	ms	Factory setting	50
Set the delay time for the servo drive to change from "enable" to "disable" when the servo drive's enable signal changes from "valid" to "invalid".						

P01.37	Name	Speed regulator saturation detection time			Related mode	-
	Setting range	0～65535	Unit	10ms	Factory setting	450
When the continuous saturation time of the internal speed regulator in the system exceeds this set value, a speed regulator saturation alarm will be generated. It is used to prevent excessive continuous current caused by mechanical jamming or other reasons. ● Note: When the set value is 0, the speed regulator saturation detection fault alarm is prohibited.						

P01.42	Name	Command overload initial detection point			Related mode	-
	Setting range	0～300	Unit	1%	Factory setting	100

Set the initial torque point for command overload protection of the servo driver. The set value is the percentage of the rated current of the servo motor. When the current torque of the servo motor is higher than this value, the system's internal command overload counter counts the command overload. After the count value exceeds, the servo drive will output a command overload alarm.

- Note: When the parameter P01.42 is greater than the parameter P01.43, the command overload protection detection function will be prohibited.

P01.43	Name	Command overload peak detection point			Related mode	-
	Setting range	0～300	Unit	1%	Factory setting	300

Set the peak torque point for command overload protection of the servo driver. The set value is the percentage of the rated current of the servo motor. Together with P01.42 and P01.44, it composes the command overload protection feature of the servo driver.

- Note: When the parameter P01.42 is greater than the parameter P01.43, the command overload protection detection function will be prohibited.

P01.44	Name	Command overload detection time			Related mode	-
	Setting range	0～65535	Unit	10ms	Factory setting	450

Set the command overload protection detection time, which is set based on the motor overload characteristic parameters.

P01.45	Name	Thermal overload initial detection point			Related mode	-
	Setting range	0～300	Unit	1%	Factory setting	100

Set the initial torque point for thermal overload protection of the servo driver. The thermal overload protection of the servo driver uses the method of I*I*T to calculate. The set value is the percentage of the rated current of the servo motor.

- Note: When the parameter P01.45 is greater than the parameter P01.46, the thermal overload protection detection function will be prohibited.

P01.46	Name	Thermal overload peak detection point			Related mode	-
	Setting range	0～300	Unit	1%	Factory setting	300

Set the peak torque point for thermal overload protection of the servo driver. The set value is the percentage of the rated current of the servo motor.Together with P01.45 and P01.47, it composes the thermal overload protection characteristics of the servo driver.

- Note: When the parameter P01.45 is greater than the parameter P01.46, the thermal overload protection detection

function will be prohibited.

P01.47	Name	Thermal overload detection time			Related mode	-
	Setting range	0～65535	Unit	10ms	Factory setting	450
Set the command overload protection detection time, which is set based on the motor thermal overload characteristic parameters.						

P01.48	Name	Overvoltage detection threshold			Related mode	-
	Setting range	1～100	Unit	V	Factory setting	85

P01.49	Name	Undervoltage detection threshold			Related mode	-
	Setting range	1～100	Unit	V	Factory setting	15

5.3 Group P02: Terminal input/output parameters

P02.00	Name	IN1 terminal function selection			Related mode	-
	Setting range	0～31	Unit	-	Factory setting	1
Set the IN function corresponding to the hardware IN1 terminal. Please refer to the following table for parameter setting:						

Set value	IN terminal function	Set value	IN terminal function
0	FunIN.0：Normal input	16	FunIN.16：Multi-segment operation command switching 3
1	FunIN.1：Servo enable	17	FunIN.17：Multi-segment operation command switching 4
2	FunIN.2：Alarm clear	18	FunIN.18：Torque command direction setting
3	FunIN.3：Pulse command prohibition	19	FunIN.19：Speed command direction setting
4	FunIN.4：Clear position deviation	20	FunIN.20：Position command direction setting
5	FunIN.5：Positive limit signal	21	FunIN.21：Multi-segment position command enable
6	FunIN.6：Negative limit signal	22	FunIN.22：Return to origin input
7	FunIN.7：Gain switching	23	FunIN.23：Origin switch signal
8	FunIN.8：Electronic gear ratio switch	24	FunIN.24：USER1
9	FunIN.9：Zero-speed clamp	25	FunIN.25：USER2
10	FunIN.10：Control mode selection 1	26	FunIN.26：USER3
11	FunIN.11：Emergency stop	27	FunIN.27：USER4
12	FunIN.12：Position command prohibition	28	FunIN.28：USER5
13	FunIN.13：Step position trigger	29	FunIN.29：Control mode selection 2
14	FunIN.14：Multi-segment operation command switching 1	30	FunIN.30：Probe 1
15	FunIN.15：Multi-segment operation command switching 2	31	FunIN.31：Probe 2

P02.01	Name	IN1 terminal logic selection			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

Set the level logic of the hardware IN1 terminal when the IN function selected by IN1 is valid. Please set the effective level logic correctly according to the host computer and peripheral circuit.

Set value	IN terminal logic when IN function is valid
0	Low level
1	High level

P02.02	Name	IN2 terminal function selection			Related mode	-
	Setting range	0～31	Unit	-	Factory setting	5

P02.03	Name	IN2 terminal logic selection			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

P02.04	Name	IN3 terminal function selection			Related mode	-
	Setting range	0～31	Unit	-	Factory setting	6

P02.05	Name	IN3 terminal logic selection			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

P02.06	Name	IN4 terminal function selection			Related mode	-
	Setting range	0～31	Unit	-	Factory setting	23

P02.07	Name	IN4 terminal logic selection			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

P02.08	Name	IN5 terminal function selection			Related mode	-
	Setting range	0～31	Unit	-	Factory setting	0

P02.09	Name	IN5 terminal logic selection			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

P02.10	Name	IN6 terminal function selection			Related mode	-
	Setting range	0～31	Unit	-	Factory setting	0

P02.11	Name	IN6 terminal logic selection			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

P02.12	Name	IN7 terminal function selection			Related mode	-
	Setting range	0～31	Unit	-	Factory setting	0

P02.13	Name	IN7 terminal logic selection			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

P02.14	Name	IN8 terminal function selection			Related mode	-
	Setting range	0～31	Unit	-	Factory setting	0

P02.15	Name	IN8 terminal logic selection			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

P02.16	Name	IN9 terminal function selection			Related mode	-
	Setting range	0～31	Unit	-	Factory setting	0

P02.17	Name	IN9 terminal logic selection			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

P02.32	Name	OUT1 terminal function selection			Related mode	-
	Setting range	0～31	Unit	-	Factory setting	1

Set the OUT function corresponding to the OUT1 terminal. Refer to the following table for parameter Settings.

Set value	OUT terminal function	Set value	OUT terminal function
0	FunOUT.0：Brake	9	FunOUT.9：USER3
1	FunOUT.1：Alarm	10	FunOUT.10：USER4
2	FunOUT.2：Position reached	11	FunOUT.11：USER5
3	FunOUT.3：Speed reached	12	FunOUT.12：USER6
4	FunOUT.4：Servo ready	13	FunOUT.13：Torque reached
5	FunOUT.5：Internal position command stop	14	FunOUT.14：Out-of-tolerance output
6	FunOUT.6：Return to origin completed	15～30	Reserve
7	FunOUT.7：USER1	31	Universal output
8	FunOUT.8：USER2		

P02.33	Name	OUT1 terminal logic selection			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

Set the output level logic of the hardware OUT1 terminal when the OUT function selected by OUT1 is valid.

Set value	OUT1 terminal logic when the OUT function is valid	Transistor state
0	Low level	Conduction
1	High level	Shut off

P02.34	Name	OUT2 terminal function selection			Related mode	-
	Setting range	0～31	Unit	-	Factory setting	6

P02.35	Name	OUT2 terminal logic selection			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

P02.36	Name	OUT3 terminal function selection			Related mode	-
	Setting range	0～31	Unit	-	Factory setting	0

P02.37	Name	OUT3 terminal logic selection			Related mode	-
	Setting range	0～1	Unit	-	Factory setting	0

P02.52	Name	IN terminal forced effective			Related mode	-
	Setting range	0～65535	Unit	-	Factory setting	0

Set the FunIN function corresponding to the IN terminal to be forcibly valid. If the corresponding bit is set to 1, the FunIN function corresponding to the IN terminal is forcibly valid. Set to 0, no effect. As follows:

BIT	Corresponding IN terminal
7～15	Reserve
8	IN9
7	IN8
6	IN7
5	IN6
4	IN5
3	IN4
2	IN3
1	IN2
0	IN1

P02.53	Name	OUT terminal forced effective			Related mode	-
	Setting range	0～65535	Unit	-	Factory setting	0

Setting OUT terminal output to be forcibly valid. If the corresponding bit is set to 1, the OUT terminal is forcibly valid. Set to 0, no effect. As follows:

BIT	Corresponding OUT terminal
3～15	Reserve
2	OUT3
1	OUT2
0	OUT1

P02.54 P02.55	Name	FunIN function valid flag			Related mode	-
	Setting range	-	Unit	-	Factory setting	显示

Displays the effectiveness of the FunIN function of the current driver. The value "1" indicates that the FunIN function is valid, and the value "0" indicates that the FunIN function is invalid.

BIT	Description	BIT	Description
0	FunIN.0：Normal input	16	FunIN.16：Multi-segment operation command switching 3
1	FunIN.1：Servo enable	17	FunIN.17：Multi-segment operation command switching 4
2	FunIN.2：Alarm clear	18	FunIN.18：Torque command direction setting
3	FunIN.3：Pulse command prohibition	19	FunIN.19：Speed command direction setting
4	FunIN.4：Clear position deviation	20	FunIN.20：Position command direction setting
5	FunIN.5：Positive limit signal	21	FunIN.21：Multi-segment position command enable
6	FunIN.6：Negative limit signal	22	FunIN.22：Return to origin input
7	FunIN.7：Gain switching	23	FunIN.23：Origin switch signal
8	FunIN.8：Electronic gear ratio switch	24	FunIN.24：USER1
9	FunIN.9：Zero-speed clamp	25	FunIN.25：USER2
10	FunIN.10：Control mode selection 1	26	FunIN.26：USER3
11	FunIN.11：Emergency stop	27	FunIN.27：USER4
12	FunIN.12：Position command prohibition	28	FunIN.28：USER5
13	FunIN.13：Step position trigger	29	FunIN.29：Control mode selection 2
14	FunIN.14：Multi-segment operation command switching 1	30	FunIN.30：Probe 1
15	FunIN.15：Multi-segment operation command switching 2	31	FunIN.31：Probe 2

P02.56 P02.57	Name	The rising edge of the FunIN function latches the valid flag			Related mode	-
	Setting range	0～65535	Unit	-	Factory setting	-

Shows the effectiveness of the input function's rising edge latch since the FunIN function of the current driver was cleared last time. The corresponding BIT bit field value is "1", which means that the FunIN function has detected the

rising edge state, and the corresponding BIT bit field value is " 0" means that the FunIN function has not detected the rising edge state.

Write the value "1" to the corresponding BIT field of this parameter to clear the latch flag.

FunIN corresponds to the parameter BIT bit field, please refer to parameter P02.54/P02.55

P02.58 P02.59	Name	The falling edge of the FunIN function latches the valid flag			Related mode	-
	Setting range	0～65535	Unit	-	Factory setting	-

Shows the effectiveness of the input function's falling edge latch since the FunIN function of the current driver was cleared last time. The corresponding BIT bit field value is "1", which means that the FunIN function has detected the falling edge state, and the corresponding BIT bit field value is " 0" means that the FunIN function has not detected the falling edge state.

Write the value "1" to the corresponding BIT field of this parameter to clear the latch flag.

FunIN corresponds to the parameter BIT bit field, please refer to parameter P02.54/P02.55

P02.60 P02.61	Name	FunOUT function valid flag			Related mode	-
	Setting range	-	Unit	-	Factory setting	显示

Display the effectiveness of the FunOUT function of the current driver. The value "1" indicates that the FunOUT function is valid, and the value "0" indicates that the FunOUT function is invalid.

Set value	Description	Set value	Description
0	FunOUT.0：Brake	9	FunOUT.9：USER3
1	FunOUT.1：Alarm	10	FunOUT.10：USER4
2	FunOUT.2：Position reached	11	FunOUT.11：USER5
3	FunOUT.3：Speed reached	12	FunOUT.12：USER6
4	FunOUT.4：Servo ready	13	FunOUT.13：Torque reached
5	FunOUT.5：Internal position command stop	14	FunOUT.14：Out-of-tolerance output
6	FunOUT.6：Return to origin completed	15～30	Reserve
7	FunOUT.7：USER1	31	Universal output
8	FunOUT.8：USER2		

P02.62	Name	Physical output enable			Related mode	-
	Setting range	0～65535	Unit	-	Factory setting	0

When the output function of the OUT port is set to "FunOUT.31 general output", the output status of the OUT port of the servo driver can be controlled by operating the P02.62 and P02.63 parameters.

BIT	Set value	Corresponding to IN terminal
3～15	-	Reserve
2	0	0：OUT3 output port is not controlled by BIT2 of P02.63
	1	1：OUT3 output port is controlled by BIT2 of P02.63
1	0	0：OUT2 output port is not controlled by BIT1 of P02.63
	1	1：OUT2 output port is controlled by BIT1 of P02.63
0	0	0：OUT1 output port is not controlled by BIT0 of P02.63
	1	1：OUT1 output port is controlled by BIT0 of P02.63

P02.63	Name	Physical output status			Related mode	-
	Setting range	0～65535	Unit	-	Factory setting	0

When the output function of the OUT port is set to "FunOUT.31 general output", the output status of the OUT port of the servo driver can be controlled by operating the P02.62 and P02.63 parameters. Only when the corresponding bit field of the P02.62 parameter is set to "1" (enable), the OUT port of the servo driver is controlled by the P02.63 parameter.

BIT	Set value	Corresponding to IN terminal
3～15	-	Reserve
2	0	0：OUT3 output port optocoupler is off
	1	1：OUT3 output port optocoupler is on
1	0	0：OUT2 output port optocoupler is off
	1	1：OUT2 output port optocoupler is on
0	0	0：OUT1 output port optocoupler is off
	1	1：OUT1 output port optocoupler is on

5.4 Group P03: Position control parameters

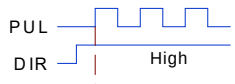
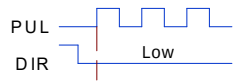
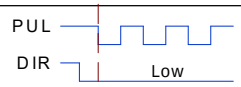
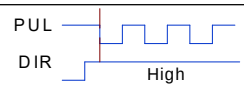
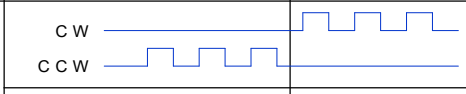
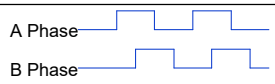
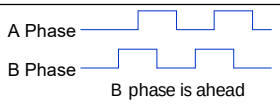
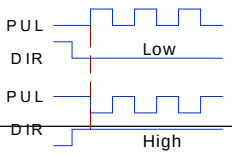
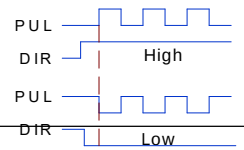
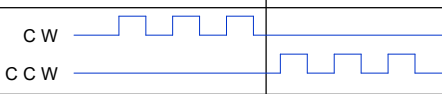
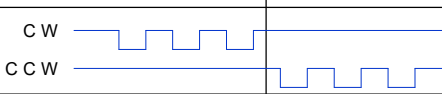
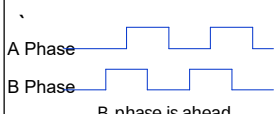
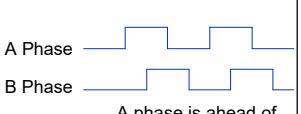
P03.00	Name	Position command source			Related mode	-
	Setting range	0～10	Unit	-	Factory setting	0

In position control mode, it is used to select the source of position command. Among them, the pulse command belongs to the external position command, and the step operation, the multi-segment position command, and the internal test position command belong to the internal position command.

Set value	Command source	Command acquisition method
0	Pulse command	The host computer or other pulse generating devices generate position commands and input them to the servo drive through hardware terminals.
1	Step	The step displacement is set by the parameter P03.28/P03.29, and the step operation is triggered by the IN function FunIN.13.
2	Multi-segment position command	The multi-segment position operation mode is set by the P09 group parameters, and the multi-segment position operation is triggered by the IN function FunIN.21.
3	Communication control	Communication given position, speed and other parameters as well as start and stop command.
4	Communication control 2	Communication given position, and trajectory can be modified dynamically.
5	IO control	Control the jog forward and reverse rotation and fixed length forward and reverse rotation in the motor position mode through the IN input.
5～10	-	Reserve command source, do not set.

P03.02	Name	Pulse command type			Related mode	-
	Setting range	0～3	Unit	-	Factory setting	0

When setting the position command source as pulse command (P03.00=0), input the pulse form.

P01.01 Rotation direction selection	P03.02 Command type setting	Command type	Signal	Schematic diagram of forward pulse	Schematic diagram of reverse pulse
0	0	Pulse + direction Positive logic	PUL DIR		
	1	Pulse + direction Negative logic	PUL DIR		
	2	CW+CCW	PUL(CW) DIR(CCW)	 	
	3	A phase + B phase Quadrature pulse 4 times frequency	PUL (A phase) DIR (B phase)		
1	0	Pulse + direction Positive logic	PUL DIR		
	1	Pulse + direction Negative logic	PUL DIR		
	2	CW+CCW	PUL （CW） DIR （CCW）	 	
	3	A phase + B phase Quadrature pulse	PUL (A phase) DIR (B phase)		

		4 times frequency			

P03.04	Name	Position command average filter time constant			Related mode	-
	Setting range	1～2048	Unit	0.1ms	Factory setting	1
Set the average filter time constant of the position command (encoder unit). This function has no effect on the total number of position commands. If the set value is too large, the response delay will increase. The filter time constant should be set according to the actual situation.						

P03.05	Name	Position command first-order low-pass filter time constant			Related mode	-
	Setting range	0～65535	Unit	0.1ms	Factory setting	0
Set the first-order low-pass filter time constant of the position command (encoder unit). This function has no effect on the total number of position commands. If the set value is too large, the response delay will increase. The filter time constant should be set according to the actual situation.						

P03.06 P03.07	Name	Number of position commands for one motor rotation			Related mode	-
	Setting range	0～8388608	Unit	P/r	Factory setting	10000
Set the number of position commands required for the motor to not rotate one revolution. P03.06 and P03.07 are combined into a 32-bit value, where P03.06 is the low 16-bit value, and P03.07 is the high 16-bit value. Subsequent use P03.06 to represent the 32-bit parameter. When P03.06=0, the parameters of electronic gear ratio 1 and 2 (P03.08～P03.15) are valid. When P03.06≠0, electronic gear ratio B/A=encoder resolution/P03.06, at this time, electronic gear ratio 1 and electronic gear ratio 2 are invalid.						

P03.08 P03.09	Name	Electronic gear ratio numerator 1			Related mode	P
	Setting range	1～1073741824	Unit	-	Factory setting	1
Set the first group of electronic gear ratio numerator for position command (command unit) frequency division. P03.08 and P03.09 are combined into a 32-bit value, where P03.08 is the low 16-bit value, and P03.09 is the high 16-bit value. Subsequent use P03.08 to represent the 32-bit parameter. P03.06 (number of position command pulses per motor rotation)=0 is valid.						

P03.10 P03.11	Name	Electronic gear ratio denominator 1			Related mode	P
	Setting range	1～1073741824	Unit	-	Factory setting	1
Set the first group of electronic gear ratio denominator for position command (command unit) frequency division. P03.10 and P03.11 are combined into a 32-bit value, where P03.10 is the low 16-bit value, and P03.11 is the high 16-bit value. Subsequent use P03.10 to represent the 32-bit parameter. P03.06 (number of position command pulses per motor rotation)=0 is valid.						

P03.12 P03.13	Name	Electronic gear ratio numerator 2			Related mode	P
	Setting range	1～1073741824	Unit	-	Factory setting	1
Set the second group of electronic gear ratio numerator for position command (command unit) frequency division. P03.12 and P03.13 are combined into a 32-bit value, where P03.12 is the low 16-bit value, and P03.13 is the high 16-bit value. Subsequent use P03.12 to represent the 32-bit parameter. P03.06 (number of position command pulses per motor rotation)=0 is valid.						

P03.14 P03.15	Name	Electronic gear ratio denominator 2			Related mode	P
	Setting range	1～1073741824	Unit	-	Factory setting	1
Set the second group of electronic gear ratio denominator for position command(command unit) frequency division. P03.14 and P03.15 are combined into a 32-bit value, where P03.14 is the low 16-bit value, and P03.15 is the high 16-bit value. Subsequent use P03.14 to represent the 32-bit parameter. P03.06 (number of position command pulses per motor rotation) = 0, valid						

P03.20	Name	In-position signal establishment time			Related mode	P
	Setting range	0～65535	Unit	0.1ms	Factory setting	10
It is used to set the establishment time for the in-position signal output to change from invalid to valid state. After the driver has passed the delay time set by P03.21, if the position command error is less than the setting value of positioning accuracy P03.22, and the time set by P03.20 is maintained, the driver will output an in-position completion signal.						

P03.21	Name	Position command stop detection time			Related mode	P
	Setting range	0～65535	Unit	0.1ms	Factory setting	10
It is used to set the detection time when the position command stops. After the driver detects that the position command is stopped, and after the set time has elapsed, the output logic of the in-position signal is processed.						

P03.22	Name	Positioning completion threshold			Related mode	P
	Setting range	1～65535	Unit	Encoder unit	Factory setting	10
Set the threshold of the absolute value of the position deviation when the servo driver outputs the positioning completion signal.						

P03.23	Name	Clear position deviation action selection			Related mode	P
	Setting range	0～1	Unit	-	Factory setting	0

Set the clear mode of position deviation when servo enable is OFF.

Set value	Clear position deviation mode
0	Servo enable OFF, clear position deviation
1	Servo enable OFF,do not clear position deviation

P03.24	Name	Position deviation fault detection prohibited			Related mode	P
	Setting range	0: Enable position deviation fault detection 1: Disable position deviation fault detection	Unit	-	Factory setting	0

P03.25 P03.26	Name	Position deviation fault detection threshold			Related mode	P
	Setting range	1～1073741824	Unit	Encoder unit	Factory setting	1310720
Set the fault threshold for excessive position deviation in position control mode. When the position deviation of the servo motor is greater than the threshold, the servo drive will generate AL.240 (excessive position deviation). P03.25						

and P03.26 are combined into a 32-bit value, where P03.25 is the low 16-bit value, and P03.26 is the high 16-bit value. Subsequent use P03.25 to represent the 32-bit parameter.

P03.27	Name	Reserve			Related mode	-
	Setting range	-	Unit	-	Factory setting	-

P03.28 P03.29	Name	Step operation			Related mode	P
	Setting range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000
Set the position command source as the number of position commands in step operation (P03.00=00). P03.28 and P03.29 are combined into a 32-bit value, where P03.28 is the low 16-bit value, and P03.29 is the high 16-bit value. Subsequent use P03.28 to represent the 32-bit parameter. Motor displacement=P03.28×electronic gear ratio. The positive or negative of P03.28 determines the positive or negative of the motor speed.						

P03.30	Name	Step operation speed			Related mode	P
	Setting range	0～6000	Unit	rpm	Factory setting	1000
Set the maximum operating speed during stepping operation.						

P03.31	Name	Step operation acceleration time constant			Related mode	P
	Setting range	1～65535	Unit	ms	Factory setting	200
Set the variable speed time when the motor speed is changed from 0rpm to 1000rpm during step operation.						

P03.32	Name	Step operation deceleration time constant			Related mode	P
	Setting range	1～65535	Unit	ms	Factory setting	200
Set the variable speed time when the motor speed is changed from 1000rpm to 0rpm during step operation.						

P03.40	Name	Homing enable control			Related mode	P
	Setting range	0～6	Unit	-	Factory setting	1

Set the homing mode and trigger signal source.

Set value	Speed command source	Remark	
		Homing mode	Trigger signal
0	Close the homing	Prohibit return to origin	No
1	Input the "homing start" signal through the IN terminal to enable the origin back to zero	Origin back to zero	IN signal FunIN.22 (homing start)
2	Input the "homing start" signal through the IN terminal to enable the electrical back to zero	Electrical return to zero	IN signal FunIN.22 (homing start)
3	Start the homing immediately after power-on	Origin back to zero	The driver is powered on and enabled for the first time
4	Immediately origin back to zero	Origin back to zero	The driver is enabled, after returning to the origin is completed, P03.40=0
5	Immediately electrical return to zero	Electrical return to zero	The driver is enabled, after returning to the origin is completed, P03.40=0
6	Take the current position as the origin	Origin back to zero	The driver is enabled, after returning to the origin is completed, P03.40=0

P03.41	Name	Homing mode selection			Related mode	P
	Setting range	0～13	Unit	-	Factory setting	0

Set the motor rotation direction, deceleration point and origin when returning to the origin.

Set value	Speed command source			Remark
	Homing direction	Deceleration point	Origin	
0	Forward	Origin switch	Origin switch	Forward/reverse: consistent with the definition of P01.01 (rotation direction selection); Origin switch: IN function FunIN.23 (origin switch signal).
1	Reverse	Origin switch	Origin switch	
2	Forward	Positive limit	Positive limit	Positive limit switch: IN function FunIN.5 (positive limit signal)
3	Reverse	Negative limit	Negative limit	Negative limit switch: IN function FunIN.6 (negative limit signal)
4	Forward	Mechanical limit position	Mechanical limit position	Use torque mode to return to zero
5	Reverse	Mechanical limit position	Mechanical limit position	
Other	Reserve	Reserve	Reserve	Reserve

P03.42	Name	High speed search origin switch signal speed			Related mode	P
	Setting range	0～3000	Unit	rpm	Factory setting	100

Set the motor speed when the origin is back to zero and search the origin signal at high speed.

P03.43	Name	Low speed search origin switch signal speed			Related mode	P
	Setting range	0～1000	Unit	rpm	Factory setting	50

Set the motor speed when the origin is back to zero and the signal of the deceleration point is searched at low speed.

P03.44	Name	Search for the acceleration and deceleration time constant	Related	P

		of the zero switch signal			mode	
	Setting range	1～65535	Unit	ms	Factory setting	100
Set the time for the speed to change uniformly from 0rpm to 1000rpm when the origin is back to zero.						

P03.45	Name	Reserve			Related mode	-
	Setting range	-	Unit	-	Factory setting	-

P03.46 P03.47	Name	Mechanical origin offset			Related mode	P
	Setting range	-1073741824～1073741824	Unit	Command pulse	Factory setting	0
Set the offset relationship between the mechanical origin and the mechanical zero when returning to the origin. Among them, P03.46 is the low 16-bit value, and P03.47 is the high 16-bit value. The two are combined into a signed 32-bit integer value. Subsequent use P03.46 to represent the 32-bit integer value.						

P03.49	Name	Mechanical origin offset and limit processing method			Related mode	P
	Setting range	0～3	Unit	-	Factory setting	0

Set the offset relationship between the mechanical origin and the mechanical zero when returning to the origin.

Set value	Mechanical origin offset processing method	Remark	
		Mechanical origin	Limit processing method
0	P03.46 is the coordinate after the origin return, when the limit is met, the origin return is triggered again and the origin return is enabled to find the origin in the reverse direction.	The machine origin does not coincide with the machine zero point. After the origin return is completed, the motor stops at the machine origin, and the machine origin coordinate is forced to P03.46.	Give the origin return trigger signal again, the servo will perform the origin return in the reverse direction
1	P03.46 is the relative offset after homing. Retrigger the homing when the limit is met, and find the homing in the reverse direction after the homing is enabled.	The mechanical origin coincides with the mechanical zero point. After the motor locates the mechanical origin, it will continue to move the displacement set by P03.46 and then stop.	Give the origin return trigger signal again, the servo will perform the origin return in the reverse direction
2	P03.46 is the coordinate after the origin return, and it will automatically change in the reverse direction when it encounters a limit.	The machine origin does not coincide with the machine zero point. After the origin return is completed, the motor stops at the machine origin, and the machine origin coordinate is forced to P03.46.	Servo automatically reverses, continue to perform home return
3	P03.46 is the relative offset after the origin return, and it will automatically change in the reverse direction when it encounters a limit.	The mechanical origin coincides with the mechanical zero point. After the motor locates the mechanical origin, it will continue to move the displacement se	Servo automatically reverses, continue to perform home return

P03.50	Name	Touchdown return to zero time judgment threshold			Related mode	P

	Setting range	0～65535	Unit	ms	Factory setting	100
Set the time threshold for judging that the load reaches the mechanical position in the process of touch stop back to zero.						

P03.51	Name	Touchdown return to zero speed judgment threshold			Related mode	P
	Setting range	0～1000	Unit	rpm	Factory setting	10
Set the speed threshold for judging that the load reaches the mechanical position in the process of touch stop back to zero.						

P03.52	Name	Touch stop and return to zero torque limit			Related mode	P
	Setting range	0～100	Unit	%	Factory setting	50
Set the maximum positive and negative torque limits during touch stop back to zero.						

P03.53	Name	Communication control position command type			Related mode	P
	Setting range	0～1	Unit	-	Factory setting	0
It is set in the position control mode (P01.00=0), and the position command source is set to the position command type when communication control (P03.00=4). 0: Incremental position mode 1: Absolute position mode						

P03.54	Name	Communication control acceleration time constant			Related mode	P
	Setting range	1～65535	Unit	ms	Factory setting	100
Set the time for the motor speed to uniformly accelerate from 0rpm to 1000rpm in the communication control mode.						

P03.55	Name	Communication control deceleration time constant			Related mode	P
	Setting range	1～65535	Unit	ms	Factory setting	100
Set the time for the motor speed to uniformly decelerate from 1000rpm to 0rpm in the communication control mode.						

P03.56	Name	Communication control operating speed			Related mode	P
	Setting range	0～6000	Unit	rpm	Factory setting	500
Set the maximum operating speed of the motor in the communication control mode.						

P03.57 P03.58	Name	Communication control position command			Related mode	P
	Setting range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

Set the position command of the motor in the communication control mode. Among them, P03.57 is the low 16-bit value, and P03.58 is the high 16-bit value. The two form a 32-bit signed integer value.

- **Note: In communication control mode, the upper computer triggers the operation of the motor by writing P03.58.**

5.5 Group P04: Speed control parameters

P04.00	Name	Speed command source selection			Related mode	S
	Setting range	0～10	Unit	-	Factory setting	0

Set the source of the speed command.

Set value	Speed command source	Command acquisition method
0	Number given	The motor running speed is set by P04.01, and the operation is triggered by the servo enable signal
1	Multi-segment position command	The multi-segment position operation mode is set by the P10 group parameters, and the operation is triggered by the servo enable signal
2	Communication control	Communication given position, speed and other parameters as well as start and stop command
3	IO control	Control the JOG forward and reverse rotation of the motor through the IN terminal input signal
4	Analog control	Control the forward and reverse rotation of the motor through the analog input voltage
5～10	Reserve	Don't set

P04.01	Name	Speed command digital given value			Related mode	S
	Setting range	-6000～6000	Unit	rpm	Factory setting	1000

Set the speed command source as the speed command value when digital setting (P04.00=0). The running acceleration time constant and deceleration time constant are set by P04.04 and P04.05.

P04.02	Name	Analog input channel settings			Related mode	S
	Setting range	0～1	Unit	-	Factory setting	0

When P04.00=4, which analog input channel needs to be used as the analog voltage source for motor speed control

0: AI1 channel

1: AI2 channel

P04.04	Name	Jog speed setting value			Related mode	S
	Setting range	0～6000	Unit	rpm	Factory setting	1000

When setting the keystroke jog function of the servo driver, set the jog speed command value. To use the keystroke jog function of the servo driver, please set the servo enable to OFF. The operation acceleration time constant and deceleration time constant are set by P04.04 and P04.05.

P04.05	Name	Speed command acceleration time constant			Related mode	S
	Setting range	1～65535	Unit	ms	Factory setting	200
Set the time for the speed to change uniformly from 0rpm to 1000rpm when P04.01 and P04.04 are in motion.						

P04.06	Name	Speed command deceleration time constant			Related mode	S
	Setting range	1～65535	Unit	ms	Factory setting	200
Set the time for the speed to change uniformly from 1000rpm to 0rpm when P04.01 and P04.04 are in motion.						

P04.07	Name	Zero speed clamp speed threshold			Related mode	S
	Setting range	0～3000	Unit	rpm	Factory setting	10
Set the speed threshold for the zero-speed clamp operation to take effect only when the actual motor speed is lower than the set value. **Note: The host computer gives a zero-speed clamp signal, and when the actual motor speed is lower than the set value, the motor is clamped at the current position.**						

P04.14	Name	Speed reaches the detection threshold			Related mode	-
	Setting range	0～6000	Unit	rpm	Factory setting	1000
When the filtered absolute value of the actual speed of the servo motor exceeds the threshold set by P04.14, it is considered that the actual speed of the servo motor has reached the desired value, and the servo driver can output a speed arrival signal at this time. On the contrary, if the absolute value of the actual speed of the servo motor after filtering is not greater than this value, the speed arrival signal is invalid. The judgment of the speed arrival signal is not affected by the operating state and control mode of the driver.						

P04.15	Name	Reserve			Related mode	-
	Setting range	-	Unit	-	Factory setting	-

P04.16	Name	Speed mode jog forward speed			Related mode	S
	Setting	0～6000	Unit	rpm	Factory	200

	range				setting	

P04.17	Name	Speed mode jog reversal speed			Related mode	S
	Setting range	0～6000	Unit	rpm	Factory setting	200

P04.18	Name	Speed mode jog acceleration time constant			Related mode	S
	Setting range	1～65535	Unit	ms	Factory setting	100

P04.19	Name	Speed mode jog deceleration time constant			Related mode	S
	Setting range	1～65535	Unit	ms	Factory setting	100

P04.20	Name	Position mode jog forward speed			Related mode	P
	Setting range	0～6000	Unit	rpm	Factory setting	200

P04.21	Name	Position mode jog reversal speed			Related mode	P
	Setting range	0～6000	Unit	rpm	Factory setting	200

P04.22	Name	Position mode jog acceleration time constant			Related mode	P
	Setting range	1～65535	Unit	ms	Factory setting	100

P04.23	Name	Position mode jog deceleration time constant			Related mode	P
	Setting range	1～65535	Unit	ms	Factory setting	100

P04.24 P04.25	Name	Position mode fixed length stroke			Related mode	P
	Setting range	0～1073741824	Unit	Command pulse	Factory setting	10000

P04.60 P04.61	Name	Communication control command pulse number			Related mode	S
	Setting	0～1073741824	Unit	Command pulse	Factory	50000

	range				setting	

P04.62	Name	Communication control speed			Related mode	S
	Setting range	0～6000	Unit	rpm	Factory setting	1000

P04.63	Name	Communication control acceleration time constant			Related mode	S
	Setting range	1～65535	Unit	ms	Factory setting	200
Set the time for the speed to change uniformly from 0rpm to 1000rpm in internal test.						

P04.64	Name	Communication control deceleration time constant			Related mode	S
	Setting range	1～65535	Unit	ms	Factory setting	200
Set the time for the speed to change uniformly from 1000rpm to 0rpm in internal test.						

P04.65	Name	Communication control operation mode			Related mode	S
	Setting range	0～1	Unit	-	Factory setting	0

Set the operating mode of the internal test run.

Set value	Operating mode
0	Motor reciprocating
1	Motor runs in one direction

P04.66	Name	Communication control initial operation direction			Related mode	S
	Setting range	0～1	Unit	-	Factory setting	0

Set the initial running direction of the internal test run.

Set value	Starting direction
0	Positive direction
1	Negative direction

P04.67	Name	Communication control operation times			Related mode	S
	Setting range	0～65535	Unit	-	Factory setting	0

Set the running times of the communication control operation. In the reciprocating operation mode, the motor reciprocates completely once, and the number of runs is counted once. In unidirectional running mode, the motor stops after running and counts the number of runs.

Set value	Starting direction
0	Unlimited times
1～65535	Run the set number of times

P04.68	Name	Open loop operation speed			Related mode	-
	Setting range	0～3000	Unit	rpm	Factory setting	100

P04.69	Name	Open loop operation acceleration			Related mode	-
	Setting range	1～100	Unit	r/s^2	Factory setting	10

P04.70	Name	Open loop operation deceleration			Related mode	-
	Setting range	1～100	Unit	r/s^2	Factory setting	10

P04.71	Name	Open loop operation torque			Related mode	-
	Range	0~100	Unit	%	Defaults	50

P04.72	Name	Open loop operation start-stop command			Related mode	-
	Range	0~6	Unit	-	Defaults	0

Set the start-stop command for motor open-loop operation.

Set value	Start-stop command
0	Read: The motor is in a waiting state/in a running state Write: No effect
3	Open loop forward
4	Open loop reversal
6	Deceleration stop
Other	Invalid

P04.73	Name	Lock shaft position			Related mode	-
	Range	0~65535	Unit	-	Defaults	0

P04.74	Name	Lock shaft torque			Related mode	-
	Range	0~100	Unit	%	Defaults	50

P04.75	Name	Lock shaft start-stop command			Related mode	-
	Range	0~1	Unit	-	Defaults	0

P04.76	Name	Encoder calibration speed			Related mode	-
	Range	1~100	Unit	rpm	Defaults	10

P04.77	Name	Encoder calibration acceleration			Related mode	-
	Range	1~10	Unit	r/s^2	Defaults	1

P04.78	Name	Encoder calibration deceleration			Related mode	-
	Range	1~10	Unit	r/s^2	Defaults	1
When setting the internal test, the motor speed is changed uniformly from 1000rpm to 0rpm.						

P04.79	Name	Encoder calibration torque			Related mode	-
	Range	0~100	Unit	%	Defaults	85

P04.80	Name	Encoder calibration start command			Related mode	-
	Range	0~2	Unit	%	Defaults	0

P04.81	Name	Encoder receiving insufficient data fault counter			Related mode	Display
	Range	-	Unit	-	Defaults	-

P04.82	Name	Encoder receiving disconnection fault counter			Related mode	Display
	Range	-	Unit	-	Defaults	-

P04.83	Name	Encoder receiving CRC fault counter			Related mode	Display
	Range	-	Unit	-	Defaults	-

P04.84	Name	Encoder receiving module fault counter			Related mode	Display
	Range	-	Unit	-	Defaults	-

P04.85	Name	Encoder receiving continuous fault counter			Related mode	Display
	Range	-	Unit	-	Defaults	-

5.6 Group P05: Torque control parameters

P05.00	Name	Torque command source A			Related mode	T
	Range	0~2	Unit	-	Defaults	0

Set the command source of torque command source A.

Set value	Torque command source
0	Digital setting (P05.03)
1	Analog channel AI1
2	Analog channel AI2

P05.01	Name	Torque command source B			Related mode	T
	Range	0~2	Unit	-	Defaults	0

Set the command source of torque command source B.

Set value	Torque command source
0	Digital setting (P05.03)
1	Analog channel AI1
2	Analog channel AI2

P05.02	Name	Torque command source			Related mode	T
	Range	0~3	Unit	-	Defaults	0

Set the command source of torque command source .

Set value	Torque command source
0	Command source A
1	Command source B
2	Communication command Source (P05.20)
3	Command source A or B

P05.03	Name	Torque command digital set value			Related mode	T
	Range	-3000~3000	Unit	0.1%	Defaults	200

Set the torque command value when the torque command source is digital setting (P05.00=0). 100% corresponds to 1 times the rated torque of the motor

P05.04	Name	Driver overload factor			Related mode	T
	Range	0~3000	Unit	0.1%	Defaults	3000

Set the maximum torque command of the servo driver. 100% corresponds to 1 times the rated torque of the motor.

P05.05	Name	Torque ramp			Related mode	T
	Range	1~65535	Unit	0.1%/s	Defaults	3000
Set the increment of the torque command. A setting value of 3000 means that the torque command is evenly increased by 300% of the rated torque within 1s.						

P05.06	Name	Torque limit source (reserved)			Related mode	T
	Range	0~4	Unit	-	Defaults	0

P05.07	Name	Torque limit source AI channel (reserved)			Related mode	T
	Range	0~1	Unit	-	Defaults	0

P05.08	Name	Internal forward torque limit (reserved)			Related mode	T
	Range	0~3000	Unit	0.1%	Defaults	3000

P05.09	Name	Internal negative torque limit (reserved)			Related mode	T
	Range	0~3000	Unit	0.1%	Defaults	3000

P05.10	Name	External forward torque limit (reserved)			Related mode	T
	Range	0~3000	Unit	0.1%	Defaults	3000

P05.11	Name	External negative torque limit (reserved)			Related mode	T
	Range	0~3000	Unit	0.1%	Defaults	3000

P05.12	Name	Source of speed limit			Related mode	T
	Range	0~1	Unit	-	Defaults	0
Set the source of speed limit in torque mode: 0: Internal setting (P05.14/P05.15) 1: External analog quantity (reserved)						

P05.13	Name	Speed limit analog channel source (reserved)			Related mode	T
	Range	0~1	Unit	-	Defaults	0

P05.14	Name	Torque control forward speed limit value			Related mode	T
	Range	0~6000	Unit	rpm	Defaults	3000
Set the forward speed limit value in torque control mode.						

P05.15	Name	Torque control negative speed limit value			Related mode	T
	Range	0~6000	Unit	rpm	Defaults	3000
Set the reverse speed limit value in torque control mode.						

P05.16	Name	Torque reaches the reference value			Related mode	T
	Range	0~65535	Unit	0.1%	Defaults	0

P05.17	Name	Torque reaches the valid value			Related mode	T
	Range	0~65535	Unit	0.1%	Defaults	100

P05.18	Name	Torque reaches the invalid value			Related mode	T
	Range	0~65535	Unit	0.1%	Defaults	50

P05.19	Name	Torque reaches signal valid detection time			Related mode	T
	Range	0~65535	Unit	ms	Defaults	50

P05.20	Name	Communication given torque command			Related mode	T
	Range	0~3000	Unit	0.1%	Defaults	200

P05.21	Name	Torque running acceleration time constant			Related mode	T
	Range	1~65535	Unit	ms	Defaults	100
It takes effect when P05.26 is set to 1, and it is another processing method for torque mode. The set value is expressed as the time for the motor speed to uniformly accelerate from 0 rpm to 1000 rpm.						

P05.22	Name	Torque running deceleration time constant			Related mode	T
	Range	1~65535	Unit	ms	Defaults	100
It takes effect when P05.26 is set to 1, and it is another processing method for torque mode. The set value is expressed as the time for the motor speed to decelerate uniformly from 1000 rpm to 0 rpm.						

P05.23	Name	Torque holding time			Related mode	T
	Range	0~65535	Unit	ms	Defaults	500
It takes effect when P05.26 is set to 1, and it is another processing method for torque mode. The set value indicates that after the torque is reached and maintained for the set time, the state of the motor shaft will be transformed into a position-locked shaft or a free state according to the set value of P05.24. 0: Keep running in torque mode until the upper computer gives a torque stop signal Others: switch the running state after the torque is maintained for the set time						

P05.24	Name	Working mode after torque is reached			Related mode	T
	Range	0~3	Unit	-	Defaults	0

It takes effect when P05.26 is set to 1, and it is another processing method for torque mode. The set value indicates that after the torque reaches and maintains the setting time of P05.23, the state of the motor shaft will be transformed into a position-locked shaft or a free state according to the set value of P05.24.

0: Free state (0 torque output state)

Other: No other processing

P05.25	Name	Communication triggers torque operation			Related mode	T
	Range	0~2	Unit	-	Defaults	0

It takes effect when P05.26 is set to 1, and it is another processing method for torque mode.

0: Stop

1: Forward rotation start

2: Reversal start

P05.26	Name	Torque mode operation mode selection			Related mode	T
	Range	0~1	Unit	-	Defaults	0

P05.33	Name	Torque limit detection time (reserved)			Related mode	T
	Range	0~65535	Unit	-	Defaults	0

P05.34	Name	Reserved			Related mode	T
	Range	-	Unit	-	Defaults	-

P05.35	Name	Reserved			Related mode	T
	Range	-	Unit	-	Defaults	-

P05.36	Name	Reserved			Related mode	T
	Range	-	Unit	-	Defaults	-

P05.37	Name	Reserved			Related mode	T
	Range	-	Unit	-	Defaults	-

5.7 Group P06: Gain parameters

P06.00	Name	1st speed gain			Related mode	-
	Range	0~65535	Unit	0.1Hz	Defaults	4500

Set the proportional gain of the speed regulator. This parameter determines the response of the speed regulator. The larger the value, the faster the speed response. However, too large a value may cause vibration.

In position mode, if the position gain is increased, the speed gain must be increased.

P06.01	Name	1st speed integral time constant			Related mode	-
	Range	1~30000	Unit	0.1ms	Defaults	3500

Set the integral time constant of the speed regulator. The smaller the set value, the stronger the integral effect, and the faster the speed deviation when stopping is close to zero.

- Note: When P06.01 is set to 30000, there is no integral effect

P06.02	Name	1st position gain			Related mode	-
	Range	0~5000	Unit	0.1Hz	Defaults	500

Set the proportional gain of the position. This parameter determines the response performance of the position. Setting a larger position gain can shorten the positioning time. But too large a set value may cause mechanical vibration.

P06.03	Name	2nd speed gain			Related mode	-
	Range	0~65535	Unit	0.1Hz	Defaults	4500

P06.04	Name	2nd speed integral time constant			Related mode	-
	Range	1~30000	Unit	0.1ms	Defaults	3500

P06.05	Name	2nd position gain			Related mode	-
	Range	0~5000	Unit	0.1Hz	Defaults	500

P06.06	Name	Skd			Related mode	-
	Range	0~65535	Unit	-	Defaults	0

P06.07	Name	Skr			Related mode	-
	Range	0~65535	Unit	-	Defaults	1000

P06.08	Name	Skm			Related mode	-
	Range	0~65535	Unit	-	Defaults	0

P06.09	Name	Pki			Related mode	-
	Range	0~65535	Unit	-	Defaults	0

P06.10	Name	Pkd			Related mode	-
	Range	0~65535	Unit	-	Defaults	0

P06.14	Name	Speed feedforward low-pass filter cut-off frequency			Related mode	-
	Range	1~10000	Unit	Hz	Defaults	2000
Set the filter cut-off frequency of the speed feedforward.						

P06.15	Name	Speed feedforward low-pass filter cut-off frequency			Related mode	-
	Range	1~1000	Unit	0.1%	Defaults	0
In the position control mode, multiply the speed feedforward signal by the parameter P06.15, and the result obtained becomes the speed feedforward as part of the speed command. Increasing this parameter can increase the response speed of the position command and reduce the position deviation at a fixed speed.						

P06.16	Name	Torque feedforward low-pass filter cut-off frequency			Related mode	-
	Range	1~10000	Unit	Hz	Defaults	2000
Set the filter frequency of the torque feedforward.						

P06.17	Name	Torque feedforward gain			Related mode	-
	Range	0~1000	Unit	0.1%	Defaults	0
In the non-torque control mode, multiply the torque feedforward signal by the parameter P06.17, and the result obtained becomes the torque feedforward as part of the torque command. Increasing this parameter can improve the response speed to changing speed commands.						

P06.18	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P06.19	Name	Speed low-pass filter cut-off frequency 1			Related mode	-
	Range	1~10000	Unit	Hz	Defaults	1000
Set the cut-off frequency 1 for the low-pass filter of the speed feedback value. The smaller the setting, the smaller the speed feedback fluctuation, but the larger the feedback delay.						

P06.20	Name	Speed low-pass filter cut-off frequency 2			Related mode	-
	Range	1~10000	Unit	Hz	Defaults	1000

P06.21	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P06.24	Name	Torque command low-pass filter cut-off frequency 1			Related mode	-
	Range	1~10000	Unit	Hz	Defaults	1000
Set the torque command low-pass filter cut-off frequency. Filtering the torque command can make the torque command smoother and reduce vibration. If the filter cutoff frequency setting value is too small, the responsiveness will be reduced. Set it while confirming the responsiveness.						

P06.25	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P06.26	Name	Torque feedback low-pass filter cut-off frequency 1			Related mode	-
	Range	1~10000	Unit	Hz	Defaults	1000
Set the torque feedback low-pass filter cut-off frequency. Through the low-pass filtering of the torque feedback, the torque feedback can be made smoother and vibration can be reduced. If the set value of the filter cutoff frequency constant is too small, the responsiveness will be reduced. Set it while confirming the responsiveness.						

P06.27	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P06.28	Name	Current loop proportional gain			Related mode	-
	Range	1~50000	Unit	Hz	Defaults	1000

P06.29	Name	Current loop integral time constant			Related mode	-
	Range	1~10000	Unit	0.1ms	Defaults	1500
Set the integral time constant of the torque loop. The smaller the setting value, the faster the integration speed and the smaller the current tracking error. However, if the integration is too small, oscillation or noise will easily occur. When the set value is 10000, the integrator does not work.						

P06.30	Name	PVIA proportional gain KP			Related mode	-
	Range	0~50000	Unit	Hz	Defaults	3000

P06.31	Name	PVIA integral gain KI			Related mode	-
	Range	0~10000	Unit	-	Defaults	1000

P06.32	Name	PVIA speed gain KV1			Related mode	-
	Range	0~50000	Unit	-	Defaults	1000

P06.33	Name	PVIA speed gain KV2			Related mode	-
	Range	0~50000	Unit	-	Defaults	100

P06.34	Name	PVIA acceleration gain KA			Related mode	-
	Range	0~50000	Unit	-	Defaults	0

P06.35	Name	PVIA speed gain KVFF			Related mode	-
	Range	0~50000	Unit	-	Defaults	1000

P06.36	Name	PVIA acceleration gain KAFF			Related mode	-
	Range	0~50000	Unit	-	Defaults	0

P06.37	Name	PVIA command speed low-pass filter cut-off frequency			Related mode	-
	Range	0~10000	Unit	-	Defaults	1000

P06.38	Name	PVIA command acceleration low-pass filter cut-off frequency			Related mode	-
	Range	0~10000	Unit	-	Defaults	2000

P06.39	Name	PVIA feedback acceleration low-pass filter cut-off frequency			Related mode	-
	Range	0~10000	Unit	-	Defaults	2000

P06.40	Name	PVIA enable control			Related mode	-
	Range	0: Use the three-loop control algorithm. 1: Use PVIA control algorithm.	Unit	-	Defaults	0

P06.45	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P06.46	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P06.47	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P06.48	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P06.49	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P06.50	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P06.51	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P06.52	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P06.53	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

5.8 Group P08: Communication parameters

P08.00	Name	RS485 communication axis address			Related mode	-
	Range	1~247	Unit	-	Defaults	1
Set the servo drive axis address. 0: broadcast address. The upper computer device can write to all servo drivers through the broadcast address. The driver operates according to the broadcast data frame, but does not respond. 1 ~ 247: when multiple servo drivers are networking, each servo driver can only have a unique address, otherwise it will lead to abnormal communication or failure of communication.						

P08.01	Name	RS485 communication baud rate selection			Related mode	-
	Range	0~5	Unit	-	Defaults	5

Set the communication baud rate between the servo driver and the upper computer device. The communication baud rate of the servo driver must be consistent with the communication baud rate of the upper computer device, otherwise it cannot communicate.

Set value	Baud rate setting
0	4800 Kbps
1	9600 Kbps
2	19200 Kbps
3	38400 Kbps
4	57600 Kbps
5	115200 Kbps

P08.02	Name	RS485 communication data format selection			Related mode	-
	Range	0~5	Unit	-	Defaults	0

Set the data format when the servo driver communicates with the upper computer device. The data format of servo driver must be consistent with the upper computer device, otherwise it cannot communicate.

Set value	Data Format
0	8-bit data、no parity、1 stop bit
1	8-bit data、no parity、2 stop bits
2	8-bit data、even parity、1 stop bit
3	8-bit data、even parity、2 stop bits
4	8-bit data、odd parity、1 stop bit
5	8-bit data、odd parity、2 stop bits

P08.05	Name	CAN communication axis address			Related mode	-
	Range	1~127	Unit	-	Defaults	2

Set the CAN communication address of servo driver.

1 ~ 127: when multiple servo drivers are networking, each servo driver can only have a unique address, otherwise it will lead to abnormal communication or failure of communication.

P08.06	Name	CAN communication baud rate selection			Related mode	-
	Range	0~6	Unit	-	Defaults	4

Set the communication baud rate between the servo driver and the upper computer device. The communication baud rate of the servo driver must be consistent with the communication baud rate of the upper computer device, otherwise it cannot communicate.

Set value	Baud rate setting
0	20 Kbps
1	50 Kbps
2	100 Kbps
3	125 Kbps
4	250 Kbps
5	500 Kbps
6	1000 Kbps

P08.07	Name	CAN disconnection detection time			Related mode	-
	Range	0~65535	Unit	ms	Defaults	0

Set the detection time of CAN communication interruption. If no CANopen synchronization signal is received within the set time, CAN communication disconnection fault will be reported.

0: disconnection detection is disabled

Other values: delay time of disconnection detection

P08.08	Name	Site address assigned by EtherCAT host			Related mode	-
	Range	Display	Unit	-	Defaults	-

P08.09	Name	Display the current site alias address of the driver			Related mode	-
	Range	Display	Unit	-	Defaults	-

P08.10	Name	Set the EtherCAT communication station of the driver			Related mode	-
	Range	0~65535	Unit	-	Defaults	0

When the host cannot automatically assign the servo driver site address, you can manually assign a site address to the driver in this way.

0: the site address is not assigned manually. The site address is assigned by the host or written to EEPROM.

Other values: manually assign a station address. After the driver is powered on and initialized, the value of p08.08 will be consistent with the set value.

Note: this operation is only to write the site alias register of the ESC slave controller chip of EtherCAT. As for whether to actually enable the site address as the addressing address of the servo driver, the host needs to carry out corresponding operations.

P08.30	Name	RS232 communication axis address			Related mode	-
	Range	-	Unit	-	Defaults	1

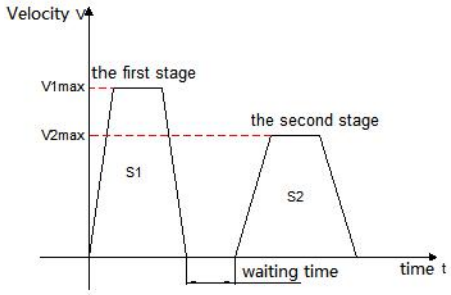
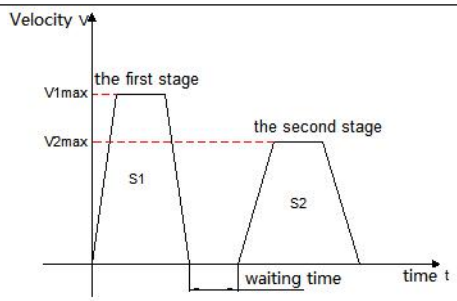
P08.31	Name	RS232 communication serial port baud rate selection			Related mode	-
	Range	0~5	Unit	-	Defaults	5
Set the RS232 communication baud rate, please refer to parameter P08.01 (RS485 communication data format selection) for the setting method.						

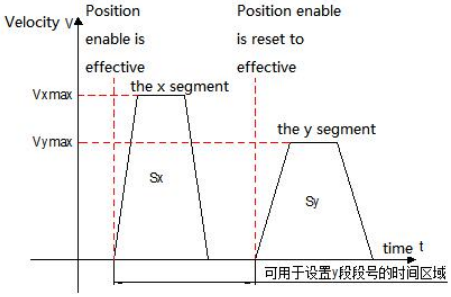
P08.32	Name	RS232 communication data format selection			Related mode	-
	Range	0~5	Unit	-	Defaults	0
Set the RS232 communication data format, please refer to parameter P08.02 (RS485 communication data format selection) for the setting method.						

5.9 Group P09: Multi-segment position parameters

P09.00	Name	Multi-stage position operation mode			Related mode	P
	Range	0~2	Unit	-	Defaults	1

In the position control mode, when the source of the set position command is multi-stage position command (p03.00 = 2), set the multi-stage position operation mode.

Set value	Operation mode	Remark	Operating waveform
0	Shutdown at the end of a single operation	Stop after running for 1 round; The segment number is automatically switched in increasing order; Waiting time can be set between segments; Multi-segment position enable is level effective;	 V_{1max}、V_{2max}: maximum operating speed of the first and second segments; S1、S2: displacement of the first and second segments;
1	Cyclic operation	Cycle operation, the starting segment number after the first round is 1; The segment number is automatically switched in increasing order; Waiting time can be set between segments; Multi-segment position enable is level effective;	 V_{1max}、V_{2max}: maximum operating speed of the first and second segments; S1、S2: displacement of the first and second segments;

2	IN switching operation	If the segment number is updated, it can run continuously; The segment number is determined by IN terminal logic; The interval between segments is determined by the command delay time of the host computer; Multi-segment position enable is effective for edge change;	 可用于设置 y 段段号的时间区域:Can be used to set the time zone of the y segment number. V_{xmax}、V_{ymax}: maximum operating speed of the x and y segments; S1、S2: displacement of the x and y segments;

P09.01	Name	Number of terminal segments of position command			Related mode	P
	Range	1~16	Unit	-	Defaults	1

Set the total number of segments of the multi-segment position command. Different segments can set different displacement, running speed, acceleration and deceleration.

When P09.00 = 0/1, the multi-segment segment number will automatically increase and switch, and the switching sequence: 1, 2, 3,..., P09.01

When P09.01 = 2, 4 INs should be set as input functions FunIN.14～FunIN.17 (multi-stage running command switching 1: CMD1～multi-stage running command switching 4: CMD4), and the logic of the IN terminal is controlled by the upper computer to achieve Segment number switching. The multi-segment segment number is a 4-digit binary number, and the corresponding relationship between CMD1 ~ CMD4 and the segment number is shown below.

FunIN.17	FunIN.16	FunIN.15	FunIN.14	segment number
CMD4	CMD3	CMD2	CMD1	
0	0	0	0	1
0	0	0	1	2
……				
1	1	1	0	15
1	1	1	1	16

The value of CMD(n) is 1 when the IN terminal logic is valid, otherwise it is 0.

P09.03	Name	Time unit selection			Related mode	P
	Range	0~1	Unit	-	Defaults	0

When the multi segment position function is used for operation and p09.00 = 0 / 1 is set, the unit of waiting time between segments is set.

Waiting time: the time interval from the end of this command to the beginning of the next command.

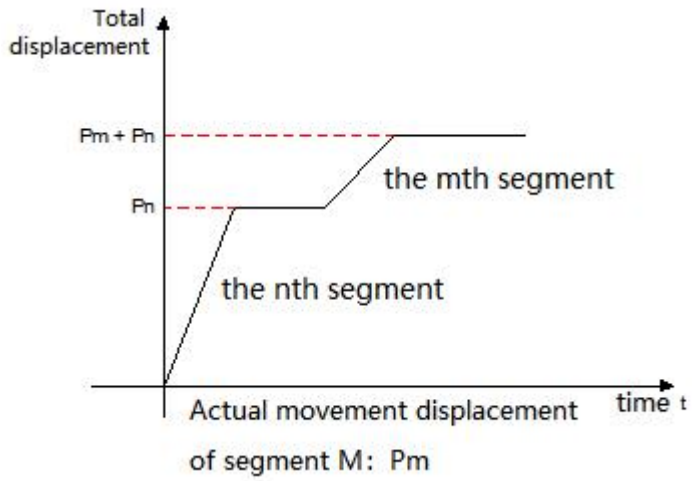
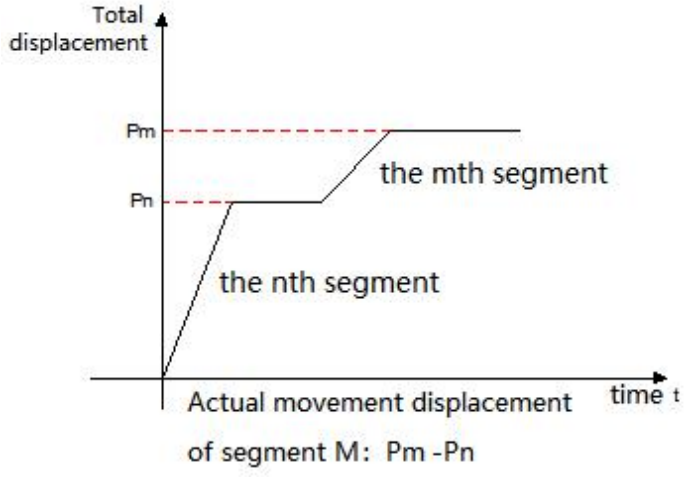
Set value	Time unit
0	ms
1	s

P09.04	Name	Position command type selection			Related mode	P
	Range	0~1	Unit	-	Defaults	0

When using the multi-segment position function to run, set the type of displacement command.

Displacement command: the sum of position commands in a period of time.

The relative displacement is the increment of the target position relative to the current position of the motor; the absolute displacement is the increment of the target position relative to the motor origin. For example: the movement displacement of the nth segment is Pn (Pn ＞ 0), and the movement displacement of the mth segment is Pm (Pm ＞ 0). Assuming Pm ＞ Pn, the comparison is as follows:

Set value	Position command type	Remark
0	Relative displacement command	
1	Absolute displacement command	

P09.12 P09.13	Name	1st position command			Related mode	P
	Range	-1073741824~1073741824	Unit	Command unit	Defaults	10000
Multi segment position first segment movement displacement (command unit). P09.12 and p09.13 are combined into a 32-bit signed value, where p09.12 is the low 16 bit value and p09.13 is the high 16 bit value. Subsequently, p09.12 is used to represent this 32-bit parameter.						

P09.14	Name	1st maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
Maximum operating speed of the first segment at multi segment position. The maximum running speed refers to the uniform running speed at which the motor is not in the acceleration and deceleration process. If the 1st position command (p09.12) is too small, the actual speed of the motor will be less than p09.14.						

P09.15	Name	1st position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100
In the first stage of multi-stage position, the time of the motor from 0rpm uniform speed to 1000rpm.						

P09.16	Name	Waiting time after the completion of 1st segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100
After the first stage of the multi-stage position is completed, the waiting time before running the next stage of displacement.						

P09.17 P09.18	Name	2nd position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.19	Name	2nd maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.20	Name	2nd position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

P09.21	Name	Waiting time after the completion of 2nd segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.22 P09.23	Name	3rd position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.24	Name	3rd maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.25	Name	3rd position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

P09.26	Name	Waiting time after the completion of 3rd segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.27 P09.28	Name	4th position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.29	Name	4th maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.30	Name	4th position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

P09.31	Name	Waiting time after the completion of 4th segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.32 P09.33	Name	5th position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.34	Name	5th maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.35	Name	5th position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

P09.36	Name	Waiting time after the completion of 5th segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.37 P09.38	Name	6th position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.39	Name	6th maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.40	Name	6th position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

P09.41	Name	Waiting time after the completion of 6th segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.42 P09.43	Name	7th position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.44	Name	7th maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.45	Name	7th position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

P09.46	Name	Waiting time after the completion of 7th segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.47 P09.48	Name	8th position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.49	Name	8th maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.50	Name	8th position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

P09.51	Name	Waiting time after the completion of 8th segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.52 P09.53	Name	9th position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.54	Name	9th maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.55	Name	9th position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

P09.56	Name	Waiting time after the completion of 9th segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.57 P09.58	Name	10th position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.59	Name	10th maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.60	Name	10th position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

P09.61	Name	Waiting time after the completion of 10th segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.62 P09.63	Name	11th position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.64	Name	11th maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.65	Name	11th position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

P09.66	Name	Waiting time after the completion of 11th segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.67 P09.68	Name	12th position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.69	Name	12th maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.70	Name	12th position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

P09.71	Name	Waiting time after the completion of 12th segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.72 P09.73	Name	13th position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.74	Name	13th maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.75	Name	13th position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

P09.76	Name	Waiting time after the completion of 13th segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.77 P09.78	Name	14th position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.79	Name	14th maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.80	Name	14th position command acceleration and deceleration time constant			Related mode	P

	Range	1~65535	Unit	ms	Defaults	100

P09.81	Name	Waiting time after the completion of 14th segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.82 P09.83	Name	15th position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

P09.84	Name	15th maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.85	Name	15th position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

P09.86	Name	Waiting time after the completion of 15th segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

P09.87 P09.88	Name	16th position command			Related mode	P
	Range	-1073741824~107341824	Unit	Command unit	Defaults	10000

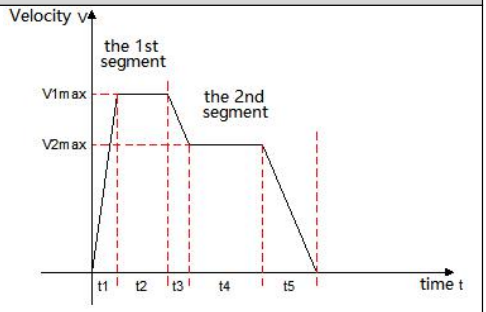
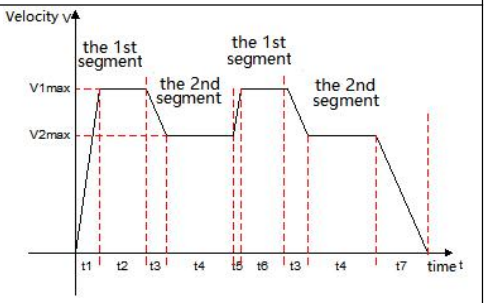
P09.89	Name	16th maximum operating speed			Related mode	P
	Range	1~6000	Unit	rpm	Defaults	200
P09.90	Name	16th position command acceleration and deceleration time constant			Related mode	P
	Range	1~65535	Unit	ms	Defaults	100

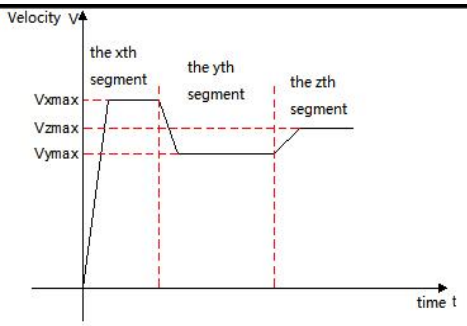
P09.91	Name	Waiting time after the completion of 16th segment position command			Related mode	P
	Range	0~65535	Unit	ms(s)	Defaults	100

5.10 Group P10: Multi-segment speed parameters

P10.00	Name	Multi-segment speed command operation mode			Related mode	S
	Range	0~2	Unit	-	Defaults	1

In speed control mode, when the speed command source is a multi-segment speed command (P04.00=1), set the multi-segment speed command operation mode:

Set value	Operation mode	Remark	Operating waveform
0	Shutdown at the end of a single operation	Stop after running for 1 round; The segment number is automatically switched in increasing order.	 V1max, V2max: the first and second command speeds; t1: the actual acceleration and deceleration time of the first segment; t3, t5: the second segment of acceleration and deceleration time.
1	Cyclic operation	Cycle operation, the starting segment number of each round is 1; the segment number is automatically switched in increasing order; If the servo enable is valid, the cycle running state will always be maintained.	 V1max、V2max：the first and second segment maximum operating speeds.

2	Switch through the external IN port	If the servo is enabled, it can run continuously; The segment number is determined by the IN terminal logic; The running time of each speed command is only determined by the switching interval time of the segment number; FunIN.19 (speed command direction setting) can be used to switch the speed command direction.	 x, y: segment number, please refer to P10.01 for the logical relationship between segment number and IN terminal; Vx, Vy: the speed command of the xth section and the yth section; The segment number determined by IN will not change, and the speed command of this segment will continue to run without being affected by the command running time.

During the operation of each speed command, the servo enable must be ensured, otherwise, the servo driver will stop.

P10.01	Name	Speed command end segment number			Related mode	S
	Range	1~16	Unit	-	Defaults	16

Set the total number of segments of the speed command. Different segments can set different speeds and running times, and there are 7 groups of acceleration and deceleration times for selection.

When P10.00≠2, the multi-segment segment numbers are automatically switched in increasing order, the switching sequence: 1, 2, ..., P10.01.

When P10.00=2, 4 INs should be set as IN functions 14～17 (FunIN.14～FunIN.17), and the upper computer controls the IN logic to realize the segment number switching. The multi-segment segment number is a 4-digit binary number. The corresponding relationship between FunIN.14～FunIN.17 and the segment number is shown in the following table.

FunIN.17	FunIN.16	FunIN.15	FunIN.14	Segment number
0	0	0	0	1
0	0	0	1	2
0	0	1	0	3
……				
1	1	1	1	16

When the IN terminal logic is valid, the value of FunIN.n is 1, otherwise it is 0.

P10.02	Name	Running time unit			Related mode	S
	Range	0~65535	Unit	-	Defaults	0

Set multi-segment speed running time unit.

Set value	Time unit
0	sec(second)
1	min(minute)

P10.03	Name	Acceleration time constant 1			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

For each multi-stage speed command, there are 7 groups of acceleration and deceleration time constants for selection.

Acceleration time constant: the time for the servo motor to uniformly accelerate from 0rpm to 1000rpm.

Deceleration time constant: the time for the servo motor to decelerate uniformly from 1000rpm to 0rpm.

P10.04	Name	Deceleration time constant 1			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

P10.05	Name	Acceleration time constant 2			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

P10.06	Name	Deceleration time constant 2			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

P10.07	Name	Acceleration time constant 3			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

P10.08	Name	Deceleration time constant 3			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

P10.09	Name	Acceleration time constant 4			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

P10.10	Name	Deceleration time constant 4			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

P10.11	Name	Acceleration time constant 5			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

P10.12	Name	Deceleration time constant 5			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

P10.13	Name	Acceleration time constant 6			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

P10.14	Name	Deceleration time constant 6			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

P10.15	Name	Acceleration time constant 7			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

P10.16	Name	Deceleration time constant 7			Related mode	S
	Range	1~65535	Unit	ms	Defaults	200

P10.20	Name	1st segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	100

P10.21	Name	1st segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	10

Set the running time of the first segment speed command.

Running time: the shifting time of the previous speed command switching to this speed command + this constant speed running time.

If the running time is set to 0, the servo driver will automatically skip this speed command.

When P10.02=2, as long as the segment number determined by the external IN terminal does not change, the speed command of this segment will continue to run without being affected by the command running time.

P10.22	Name	1st segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

Select the acceleration and deceleration time constant of the first segment speed command.

Set value	Acceleration and deceleration time constant	Remark
1	Acceleration and deceleration time constant 1	Acceleration time: P10.03 Deceleration time: P10.04
2	Acceleration and deceleration time constant 2	Acceleration time: P10.05 Deceleration time: P10.06
3	Acceleration and deceleration time constant 3	Acceleration time: P10.07 Deceleration time: P10.08
4	Acceleration and deceleration time constant 4	Acceleration time: P10.09 Deceleration time: P10.10
5	Acceleration and deceleration time constant 5	Acceleration time: P10.11 Deceleration time: P10.12
6	Acceleration and deceleration time constant 6	Acceleration time: P10.13 Deceleration time: P10.14
7	Acceleration and deceleration time constant 7	Acceleration time: P10.15 Deceleration time: P10.16

V1max, V2max: the first and second segment command speeds;

t1: the actual acceleration and deceleration time of the first segment;

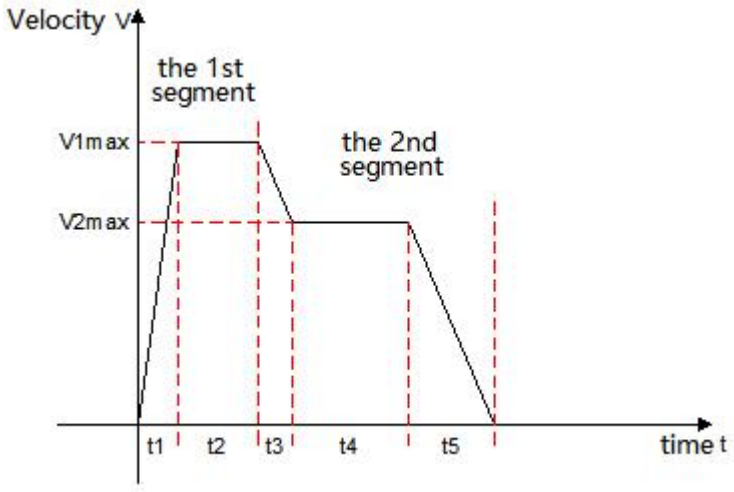
t3、 t5: the actual acceleration and deceleration time of the second segment;

A certain period of running time: the shifting time of the previous speed command switching to this speed command + the constant speed running time of this section (for example: the running time of the first segment in the figure is t1+t2, and the running time of the second segment is t3+t4. And so on);

When a certain period of running time is set to 0, the driver will skip this section of speed command and execute the next section;

$$t_1 = \frac{V_1}{1000} \times \ Acceleration\ time\ set\ for\ this\ speed\ segment$$

$$t_3 = \frac{|V_2 - V_1|}{1000} \times \ The\ acceleration\ time\ set\ in\ the\ second\ segment$$



P10.23	Name	2nd segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	200

P10.24	Name	2nd segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	20
P10.25	Name	2nd segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.26	Name	3rd segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	300

P10.27	Name	3rd segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	30
P10.28	Name	3rd segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.29	Name	4th segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	400

P10.30	Name	4th segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	40
P10.31	Name	4th segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.32	Name	5th segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	500

P10.33	Name	5th segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	50
P10.34	Name	5th segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.35	Name	6th segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	600

P10.36	Name	6th segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	60
P10.37	Name	6th segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.38	Name	7th segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	700

P10.39	Name	7th segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	70
P10.40	Name	7th segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.41	Name	8th segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	800

P10.42	Name	8th segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	80
P10.43	Name	8th segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.44	Name	9th segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	900

P10.45	Name	9th segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	90
P10.46	Name	9th segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.47	Name	10th segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	1000

P10.48	Name	10th segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	100
P10.49	Name	10th segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.50	Name	11th segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	1100

P10.51	Name	11th segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	110
P10.52	Name	11th segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.53	Name	12th segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	1200

P10.54	Name	12th segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	120
P10.55	Name	12th segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.56	Name	13th segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	1300

P10.57	Name	13th segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	130
P10.58	Name	13th segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.59	Name	14th segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	1400

P10.60	Name	14th segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	140
P10.61	Name	14th segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.62	Name	15th segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	1500

P10.63	Name	15th segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	150
P10.64	Name	15th segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

P10.65	Name	16th segment speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Defaults	1600

P10.66	Name	16th segment speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec/0.1min	Defaults	160
P10.67	Name	16th segment acceleration and deceleration time constant selection			Related mode	S
	Range	1~7	Unit	-	Defaults	1

5.11 Group P11: Auxiliary display

The following parameters are used to display the CiA402-related objects in CANopen and EtherCAT bus mode, which is convenient for viewing object values and troubleshooting.

P11.00	Name	0x603F (Error code)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.01	Name	0x6040 (Control word)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.02	Name	0x6041 (Status word)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.03	Name	0x605A (Quick stop mode selection)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.04	Name	0x605B (Shutdown mode selection)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.05	Name	0x605C (Prohibition of operation mode selection)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.06	Name	0x605E (Fault shutdown mode selection)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.07	Name	0x6060 (Mode selection)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.08	Name	0x6061 (Operating mode display)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.09 P11.10	Name	0x6062 (Position command)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.11 P11.12	Name	0x6063 (Position feedback)			Related mode	-
	Range	-	Unit	Encoder unit	Defaults	-
P11.13 P11.14	Name	0x6064 (Position feedback)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.15 P11.16	Name	0x6065 (Excessive position deviation threshold)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.17	Name	0x6066 (Position deviation time window)			Related mode	-
	Range	-	Unit	ms	Defaults	-

P11.18 P11.19	Name	0x6067 (Position reaches threshold)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.20	Name	0x6068 (Position reaches time window)			Related mode	-
	Range	-	Unit	ms	Defaults	-

P11.21 P11.22	Name	0x606C (Speed feedback)			Related mode	-
	Range	-	Unit	Command unit/s	Defaults	-

P11.23	Name	0x606D (Speed reaches threshold)			Related mode	-
	Range	-	Unit	rpm	Defaults	-

P11.24	Name	0x606E (Speed reaches time window)			Related mode	-
	Range	-	Unit	ms	Defaults	-

P11.25	Name	0x6071 (Target torque)			Related mode	-
	Range	-	Unit	0.1%	Defaults	-

P11.26	Name	0x6072 (Maximum torque)			Related mode	-
	Range	-	Unit	0.1%	Defaults	-

P11.27	Name	0x6073 (Maximum current)			Related mode	-
	Range	-	Unit	0.1%	Defaults	-

P11.28	Name	0x6074 (Internal target torque)			Related mode	-
	Range	-	Unit	0.1%	Defaults	-

P11.29	Name	0x6077 (Torque feedback)			Related mode	-
	Range	-	Unit	0.1%	Defaults	-

P11.30 P11.31	Name	0x607A (Target position)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.32 P11.33	Name	0x607C (Origin offset)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.34 P11.35	Name	0x607D_1 (Minimum software absolute position limit)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.36 P11.37	Name	0x607D_2 (Maximum software absolute position limit)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.38	Name	0x607E (Command polarity)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.39 P11.40	Name	0x607F (Maximum contour speed)			Related mode	-
	Range	-	Unit	Command unit/s	Defaults	-

P11.41 P11.42	Name	0x6081 (Contour speed)			Related mode	-
	Range	-	Unit	Command unit/s	Defaults	-

P11.43 P11.44	Name	0x6083 (Contour acceleration)			Related mode	-
	Range	-	Unit	Command unit/s^2	Defaults	-

P11.45 P11.46	Name	0x6084 (Contour deceleration)			Related mode	-
	Range	-	Unit	Command unit/s^2	Defaults	-

P11.47 P11.48	Name	0x6085 (Quick stop deceleration)			Related mode	-
	Range	-	Unit	Command unit/s^2	Defaults	-

P11.49 P11.50	Name	0x6087 (Torque slope)			Related mode	-
	Range	-	Unit	0.1%/s	Defaults	-

P11.51 P11.52	Name	0x6091_1 (Gear ratio molecular/Motor resolution)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.53 P11.54	Name	0x6091_2 (Gear ratio denominator/shaft resolution)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.55	Name	0x6098 (Homing method)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.56 P11.57	Name	0x6099_1 (Search deceleration point signal speed)			Related mode	-
	Range	-	Unit	Command unit/s	Defaults	-

P11.58 P11.59	Name	0x6099_2 (Search homing signal speed)			Related mode	-
	Range	-	Unit	Command unit/s	Defaults	-

P11.60 P11.61	Name	0x609A (Homing acceleration)			Related mode	-
	Range	-	Unit	Command unit/s^2	Defaults	-

P11.62 P11.63	Name	0x60B0 (Position offset)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.64 P11.65	Name	0x60B1 (Speed offset)			Related mode	-
	Range	-	Unit	Command unit/s	Defaults	-

P11.66	Name	0x60B2 (Torque offset)			Related mode	-
	Range	-	Unit	0.1%	Defaults	-

P11.67	Name	0x60B8 (Probe function)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.68	Name	0x60B9 (Probe status)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.69 P11.70	Name	0x60BA (Probe 1 rising edge position feedback)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.71 P11.72	Name	0x60BB (Probe 1 falling edge position feedback)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.73 P11.74	Name	0x60BC (Probe 2 rising edge position feedback)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.75 P11.76	Name	0x60BD (Probe 2 falling edge position feedback)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.77	Name	0x60D5 (Probe 1 rising edge counter)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.78	Name	0x60D6 (Probe 1 falling edge counter)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.79	Name	0x60D7 (Probe 2 rising edge counter)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.80	Name	0x60D8 (Probe 2 falling edge counter)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.81	Name	0x60E0 (Maximum forward torque limit)			Related mode	-
	Range	-	Unit	0.1%	Defaults	-

P11.82	Name	0x60E1 (Maximum negative torque limit)			Related mode	-
	Range	-	Unit	0.1%	Defaults	-

P11.83 P11.84	Name	0x60F4 (Position offset)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.85 P11.86	Name	0x60FC (Position command)			Related mode	-
	Range	-	Unit	Command unit	Defaults	-

P11.87 P11.88	Name	0x60FD (Digital input)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.89 P11.90	Name	0x60FE_1 (Physical output)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.91 P11.92	Name	0x60FE_2 (Physical output enable)			Related mode	-
	Range	-	Unit	-	Defaults	-

P11.93 P11.94	Name	0x60FF (Target speed)			Related mode	-
	Range	-	Unit	Command unit/s	Defaults	-

P11.95 P11.96	Name	0x6502 (Supported servo operation mode)			Related mode	-
	Range	-	Unit	-	Defaults	-

5.12 Group P12: Auxiliary functions

P12.00	Name	Save parameters to the EEPROM of the driver			Related mode	-
	Range	0~1	Unit	-	Defaults	0

P12.01	Name	Read parameters from the EEPROM of the driver			Related mode	-
	Range	0~1	Unit	-	Defaults	0

P12.02	Name	Restore factory default parameter values			Related mode	-
	Range	0~1	Unit	-	Defaults	0

P12.03	Name	Reset driver failure			Related mode	-
	Range	0~1	Unit	-	Defaults	0

P12.04	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P12.05	Name	Reset the encoder multi-turn value			Related mode	-
	Range	0~1	Unit	-	Defaults	0

P12.06	Name	Reset the encoder multi-turn value and fault			Related mode	-
	Range	0~1	Unit	-	Defaults	0

P12.07	Name	Reset driver			Related mode	-
	Range	-	Unit	-	Defaults	-

P12.08	Name	Reset fault record			Related mode	-
	Range	0~1	Unit	-	Defaults	0

P12.09	Name	Communication control operation position command type			Related mode	PS
	Range	0~1	Unit	-	Defaults	0

In the position control mode (P01.00=0), when the position command source is set to communication control (P03.00=3), set the type of position command.

0: Incremental position mode

1: Absolute position mode

P12.10	Name	Communication control operation start/stop command			Related mode	PS
	Range	0~6	Unit	0.1ms	Defaults	6

In the position control mode (P01.00=0), when the position command source is set to communication control (P03.00=3), it is used for communication to write the motor start/stop command.

P12.10 write value	Description
0	Write: Trigger the motor to stop. After the motor responds to the start-stop command, set P12.10 to 6;
1	Write: Trigger the motor to run forward and stop after the run command set by P04.60. After the motor responds to the start-stop command, set P12.10 to 6;
2	Write: Trigger the motor to run reversely and stop after the running command set by P04.60. After the motor responds to the start-stop command, set P12.10 to 6;
3	Write: Trigger the motor to jog forward. After the motor responds to the start-stop command, set P12.10 to 6;
4	Write: Trigger the motor to jog reverse. After the motor responds to the start-stop command, set P12.10 to 6;
5	Write: Trigger the emergency stop of the motor. After the motor responds to the start-stop command, set P12.10 to 6;
6	Write: Meaningless; Read:Indicating that the motor is running or waiting to be triggered to run;

P12.11	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P12.12	Name	Communication control demonstration operation delay time			Related mode	PS
	Range	0~65535	Unit	ms	Defaults	100

P12.13	Name	Communication control demonstration operation start/stop command			Related mode	PS
	Range	0~2	Unit	-	Defaults	0

In the position control mode (P01.00=0), when the position command source is set to communication control (P03.00=3), it is used to write the start/stop command of the motor demonstration operation by communication. In the demo running mode, the motor will start in reciprocating or single direction (P04.65=0/1) according to the running command, speed, acceleration and subtraction time constant set by P04.60～P04.64, and start in positive or negative direction (P04 .66=0/1), run the number of times set by P04.67. After completing the set running command each time, after delaying the delay time set by P12.12, restart again and run in this cycle.

P12.13 write value	Description
0	Write: Trigger the motor to stop the operation of the internal test demonstration.
1	Write: Trigger the motor to start the demonstration operation. After the drive responds to the command, P12.13 is set to 2.
2	Writing: Meaningless; reading: Indicating that the motor is working in the demo mode

P12.14	Name	Clear position error			Related mode	P
	Range	0~1	Unit	-	Defaults	0

P12.15	Name	Reserved			Related mode	-
	Range	-	Unit	-	Defaults	-

P12.16	Name	Data sampling channel 1			Related mode	-
	Range	0~65535	Unit	-	Defaults	0

P12.17	Name	Data sampling channel 2			Related mode	-
	Range	0~65535	Unit	-	Defaults	0

P12.18	Name	Data sampling interval			Related mode	-
	Range	0~65535	Unit	0.1ms	Defaults	0

P12.19	Name	Data sampling start flag			Related mode	-
	Range	0~1	Unit	-	Defaults	0

P12.20	Name	Save motor related parameters to encoder EEPROM			Related mode	-
	Range	0~2	Unit	-	Defaults	0

Non-manufacturer after-sales personnel or special designation by the manufacturer, please do not operate this parameter, otherwise it may cause abnormal operation of the motor.

P12.21	Name	Test energy consumption braking action and feedback	Related mode	-

	Range	0~2	Unit	-	Defaults	0
0: No effect/wait to start test/test end 1: Start dynamic braking/feedback action test 2: Abnormality in the energy consumption braking feedback test						

5.13 Group P13: Monitoring parameter groups

P13.00	Name	Operation ststus			Related mode	-
	Range	-	Unit	-	Defaults	Display
Display the operation status of the servo driver. 0: The servo driver is not enabled; 1: Servo driver is enabled.						

P13.01	Name	Motor speed			Related mode	-
	Range	-	Unit	rpm	Defaults	Display
Display the actual speed of the servo motor, after rounding the display, the accuracy is 1rpm.						

P13.02	Name	Speed command			Related mode	-
	Range	-	Unit	rpm	Defaults	Display
Display the current speed command value of the servo drive, after rounding the display, the accuracy is 1rpm.						

P13.03	Name	Motor torque			Related mode	-
	Range	-	Unit	%	Defaults	Display
Display actual servo motor torque, 100% corresponding to 1 times motor rated torque.						

P13.04	Name	Torque command			Related mode	-
	Range	-	Unit	%	Defaults	Display
Display the current torque command value of the servo driver, 100% corresponding to 1 times the motor rated torque.						

P13.05	Name	Operating current			Related mode	-
	Range	-	Unit	%	Defaults	Display
Display the actual operating current of the servo motor, 100% corresponds to the rated current of the servo motor.						

P13.07 P13.08	Name	Position command counter			Related mode	-
	Range	-	Unit	Command unit	Defaults	Display
In position control mode, during servo operation, the number of position commands that have not been divided and multiplied by the electronic gear ratio are counted and displayed. P13.07 and P13.08 are combined into a 32-bit value, where P13.07 is the low 16-bit value, and P13.08 is the high 16-bit value. Subsequent use P13.07 to represent the 32-bit parameter.						

P13.09 P13.10	Name	Position command counter *			Related mode	-
	Range	-	Unit	Encoder unit	Defaults	Display
In position control mode, during servo operation, the number of position commands that have not been divided and multiplied by the electronic gear ratio are counted and displayed. P13.09 and P13.10 are combined into a 32-bit value, where P13.09 is the low 16-bit value, and P13.10 is the high 16-bit value. Subsequent use P13.09 to represent the 32-bit parameter.						

P13.11 P13.12	Name	Position feedback counter			Related mode	-
	Range	-	Unit	Encoder unit	Defaults	Display
In position control mode, during servo operation, the number of position commands that have not been divided and multiplied by the electronic gear ratio are counted and displayed. P13.07 and P13.08 are combined into a 32-bit value, where P13.07 is the low 16-bit value, and P13.08 is the high 16-bit value. Subsequent use P13.07 to represent the 32-bit parameter.						

P13.13 P13.14	Name	Position deviation counter			Related mode	-
	Range	-	Unit	Command unit	Defaults	Display
In position control mode, statistics and display the position command deviation value. P13.13 and P13.14 are combined into a 32-bit value, where P13.13 is the low 16-bit value, and P13.14 is the high 16-bit value. Subsequent use P13.13 to represent the 32-bit parameter.						

P13.15 P13.16	Name	Position deviation counter *			Related mode	-
	Range	-	Unit	Encoder unit	Defaults	Display
In the position control mode, statistics and display the position deviation value after the electronic gear ratio is divided and multiplied. P13.15 and P13.16 are combined into a 32-bit value, where P13.15 is the low 16-bit value, and P13.16 is the high 16-bit value. Subsequent use P13.15 to represent the 32-bit parameter.						

P13.17	Name	Position command speed			Related mode	-
	Range	-	Unit	rpm	Defaults	Display
Display the speed value corresponding to the position command of a single position control cycle of the driver.						

P13.18	Name	Position command frequency			Related mode	-
	Range	-	Unit	KHz	Defaults	Display
Display the pulse frequency corresponding to the position command of a single position control cycle of the driver.						

P13.19	Name	Input signal monitoring			Related mode	-
	Range	-	Unit	-	Defaults	Display

Display the current level status of the IN hardware terminal of the driver. BIT corresponding to "1" means the driver INx terminal optocoupler is turned on, BIT corresponding to "0" means that the driver INx terminal optocoupler is not turned on.

BIT	Description
0	IN1 input status
1	IN2 input status
2	IN3 input status
3	IN4 input status
4	IN5 input status
5	IN6 input status
9~15	Reserved

P13.20	Name	Output signal monitoring			Related mode	-
	Range	-	Unit	-	Defaults	Display

Display the current status of the OUT hardware terminal of the drive. BIT corresponding to "1" means that the OUTx terminal of the driver has a signal output (only means that the current OUTx terminal of the driver has a driving signal, does not mean that the current driver's output port is normally output), and BIT corresponding to "0" means that there is no output signal from the OUTx terminal of the driver.

BIT	Description
0	OUT1 output status
1	OUT1 output status
2	OUT1 output status
3	OUT1 output status
4~15	Reserved

P13.21 P13.22	Name	Current mechanical Angle of motor			Related mode	-
	Range	-	Unit	Encoder unit	Defaults	Display

Display the current mechanical angle of the motor (encoder unit), 0 corresponds to the mechanical angle 0. P13.21 and P13.22 are combined into a 32-bit value, where P13.21 is the low 16-bit value, and P13.22 is the high 16-bit value. Subsequent use P13.21 to represent the 32-bit parameter. Actual mechanical angle = (P13.21 ÷ encoder pulse number) × 360°

P13.23	Name	Current electrical Angle of motor			Related mode	-
	Range	-	Unit	Degree	Defaults	Display

Display the current electrical angle of the motor, P13.23 = (P13.21 ÷ encoder pulse number) × 360°

P13.24	Name	Current voltage of the driver			Related mode	-
	Range	-	Unit	0.1V	Defaults	Display

P13.25 P13.26	Name	Encoder status register			Related mode	-
	Range	-	Unit	-	Defaults	Display

Display the status information of the encoder. P13.25 and P13.26 are combined into a 32-bit value, where P13.25 is the low 16-bit value, and P13.26 is the high 16-bit value. Subsequent use P13.25 to represent the 32-bit parameter. The 32-bit data corresponds to 1 to indicate that the event has occurred, and 0 to indicate that there is no such event. The detailed description is as follows:

BIT	Description
0	Absolute encoder fault
1	Absolute encoder command check bit fault
2	Absolute encoder delimiter fault
3	Absolute encoder overspeed fault
4	Absolute encoder status fault
5	Absolute encoder count fault
6	Absolute encoder count overflow fault
7	Absolute encoder overheating fault
8	Absolute encoder multi-turn data fault
9	Absolute encoder battery fault 1
10	Absolute encoder battery fault 2
11	Absolute encoder data receiving timeout fault 1
12	Absolute encoder data receiving timeout fault 2
13	Absolute encoder receiving command fault
14	Absolute encoder verification fault
15	Absolute encoder check command error, if this error occurs, please contact the manufacturer
16	Absolute encoder receiving status flag fault
17	Absolute encoder receiving fault
18	Incremental encoder hall signal fault
19	Incremental encoder disconnection fault
20	Incremental encoder Z phase signal latch flag
21	Incremental encoder Z phase signal last cycle latch flag
22	Encoder type/resolution setting error flag
23	Encoder calibration fault flag
24	Bus type incremental encoder index signal flag
25	Index position latch flag of bus type incremental encoder
26	UVW signal error flag of bus type incremental encoder
27:28	Bus type incremental encoder index status
29~31	Reserved

P13.27 P13.28	Name	External pulse counter			Related mode	-
	Range	-	Unit	Command unit	Defaults	Display

Displays the number of external input pulses received by the driver since the last reset. P13.27 and p13.28 are combined into a 32-bit value, where p13.27 is the low 16 bit value and p13.28 is the high 16 bit value. Subsequently, p13.27 is used to represent the 32-bit parameter.

P13.29	Name	Frequency division output pulse counting			Related mode	-
	Range	-	Unit	Command pulse	Defaults	Display
DRV series servo drivers are not available						

P13.30 P13.31	Name	Current position of the motor			Related mode	-
	Range	-	Unit	Command unit	Defaults	Display
Display the actual position of the motor shaft, the unit is command pulse. P13.30 and P13.31 are combined into a 32-bit signed value, where P13.30 is the low 16-bit value, and P13.31 is the high 16-bit value. Subsequent use P13.30 to represent the 32-bit parameter.						

P13.32 P13.33	Name	Target position(0x607A)			Related mode	-
	Range	-	Unit	Command unit	Defaults	Display
In CANopen and EtherCAT models, it is used to display the current target position 0x607A. P13.32 and P13.33 are combined into a 32-bit signed value, where P13.32 is the low 16-bit value, and P13.33 is the high 16-bit value. Subsequent use P13.32 to represent the 32-bit parameter.						

P13.36	Name	Fault code			Related mode	-
	Range	-	Unit	-	Defaults	Display
For the specific content of the fault code, please refer to the "Troubleshooting" chapter.						

P13.40 P13.41	Name	Motor encoder single-turn value			Related mode	-
	Range	-	Unit	Encoder unit	Defaults	Display
Display the current single-turn value of the motor encoder, ranging from 0 to encoder resolution. P13.40 and P13.41 are combined into a 32-bit unsigned value, where P13.40 is the low 16-bit value and P13.41 is the high 16-bit value. Subsequent use P13.40 to represent the 32-bit parameter.						

P13.42 P13.43	Name	Motor encoder multi-turn value			Related mode	-
	Range	-	Unit	Lap	Defaults	Display
Display the current multi-turn value of the motor encoder. P13.42 and P13.43 are combined into a 32-bit signed value, where P13.42 is the low 16-bit value and P13.43 is the high 16-bit value. Subsequent use P13.42 to represent the 32-bit parameter.						

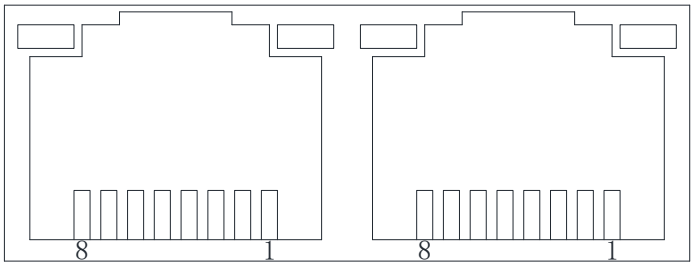
Chapter 6 Communication

The servo Driver has Modbus RTU (RS-232, RS-485) communication function, with the upper computer communication software, it can realize multiple functions such as parameter modification, parameter query and servo Driver status monitoring.

6.1 MODBUS Communication

The RS-485 communication protocol has a single-master multi-slave communication mode, which can support network operation of multiple servo Drivers. RS-232 communication protocol does not support networking of multiple servo Drivers.

6.1.1 Hardware wiring



Signal		Pin number	Function
Communication signal	RS485+	1	RS485 communication port
	RS485-	2	
	-	3	-
	CAN_H	4	CAN communication port
	CAN_L	5	
	-	6	-
	DGND	7	GND signal
	-	8	-

6.1.2 Communication parameter setting

- Servo Driver default communication settings：

Communication mode	Axis address	Baud rate	Data Format
RS485 communication	1	115200 bps	1 start bit + 8 data bits + 1 stop bit
RS232 communication	1 (fixed and unchangeable)	115200 bps	1 start bit + 8 data bits + 1 stop bit

1、 RS485 communication settings:

（1） Set the servo Driver axis address P08.00

When multiple servo Drivers are networked, each Driver can only have a unique address, otherwise it will cause abnormal communication and fail to communicate. in:

0: broadcast address

1～127: slave address

The host computer can write to all slave Drivers through the broadcast address. The slave Driver receives the broadcast address data frame and performs corresponding operations, but does not respond to data.

（2） Set the communication rate between the servo Driver and the host computer P08.01

The speed of the servo Driver and the communication speed of the host computer must be set to be consistent, otherwise the communication will not be possible. When multiple servo Drivers are networked, if the communication baud rate of a servo Driver is inconsistent with the host, it will cause the servo axis communication error and may affect the normal communication of other servo Drivers.

（3） Set the data frame format P08.02 for the communication between the servo driver and the host computer

Servo Driver provides 6 communication data formats

P08.02 set value	Communication data frame format
0	1 start bit + 8 data bits + 1 stop bit
1	1 start bit + 8 data bits + 2 stop bits
2	1 start bit + 8 data bits + 1 even parity bit + 1 stop bit
3	1 start bit + 8 data bits + 1 even parity bit + 2 stop bits
4	1 stop bit + 8 data bits + 1 odd parity bit + 1 stop bit
5	1 stop bit + 8 data bits + 1 odd parity bit + 2 stop bits

- Note: The data frame format of the host computer must conform to the above format, otherwise it cannot communicate with the Driver

2、 RS232 Communication settings：

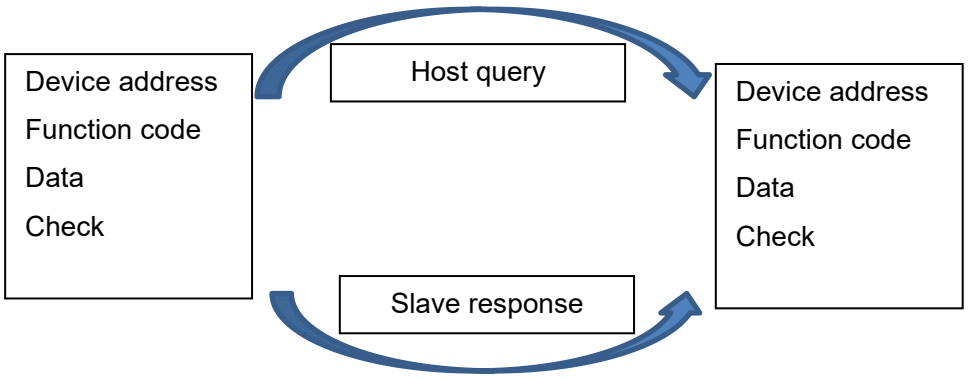
★ Description of related parameters

parameter	name	Predetermined area	Function	Effective time	Factory setting
P08.30	RS232 communication axis address	-	Set the station number of RS232 communication	After saving and restarting	1
P08.31	RS232 communication baud rate	0～5	Set the baud rate of RS232 communication	After saving and restarting	5
P08.32	RS232	0～5	Set the data format of RS232	After saving and	0

	communication data format		communication	restarting	

6.2 MODBUS communication protocol

Modbus protocol, designed by MODDICON company, is a bus protocol that allows the master station and one or more slave stations to share data. The data is composed of 16-bit registers. The master station can read and write a single register or multiple registers. The standard Modbus port on the Modicon controller uses an RS-232 compatible serial interface, which defines the connector, wiring cable, signal level, transmission baud rate and parity. Controller communication uses master-slave technology, that is, the host initiates data transmission, which is called query. Other devices (slave) return response data to the query, or process the actions required by the query. The host device includes a processor, a programmer and a PLC. The slaves include programmable controllers, servo Drivers and stepper Drivers. The master-slave query-feedback mechanism is as follows：



Note: The communication data frame structure of this servo Driver adopts RTU mode.

The MODBUS communication function code used by the servo Driver is described as follows：

Function code	Definition
0x03	Read register data
0x06	Write single register data
0x10	Write multiple register data

- **Note: The relationship between the parameter number in the manual and the register address in Modbus communication: if**

the parameter number is P08.02, the Modbus communication register address is 802 (decimal)

6.2.1 Read register data：0x03

Request frame format：

START	Idle time greater than or equal to 3.5 characters, indicating the start of a frame
ADDR	Servo axis address
CMD	Function code: 0x03
REGISTER_ADDRH	Register start address high byte
REGISTER_ADDRL	Register start address low byte
DATA_NUMBERH	The number of registers to be read N (H) high byte
DATA_NUMBERL	The number of registers to be read N (L) low byte
CRCL	CRC check code low byte
CRCH	CRC check code high byte
END	Idle time greater than or equal to 3.5 characters, one frame ends

Note: The register start address range is 0x0000 to 0xFFFF, and the register number range is 0x1 to 0x7D

Response frame format：

START	Idle time greater than or equal to 3.5 characters, indicating the start of a frame
ADDR	Servo axis address
CMD	Function code: 0x03
DATA_LENGTH	The number of data bytes returned is equal to the number of registers N*2
DATA[0]	High byte of starting data value
DATA[1]	Low byte of starting data value
DATA[…]	...
DATA[N*2-1]	Last data value low byte
CRCL	CRC check code low byte
CRCH	CRC check code high byte
END	Idle time greater than or equal to 3.5 characters, one frame ends

Example:

Host sends request frame：

0x01	0x03	0x00	0x64	0x00	0x02	CRCL	CRCH

This request frame means: read 2 (0x0002) word length data from the servo Driver whose axis address is 0x01 and the start register address is 100 (0x0064).

Slave response frame：

0x01	0x03	0x04	0x01	0x20	0x00	0x59	CRCL

The response frame means: the slave returns 4 bytes (2 words long) of data, and the data content is 0x0120, 0x0059.

6.2.2 Write a single register：0x06

Request frame format：

START	Idle time greater than or equal to 3.5 characters, indicating the start of a frame
ADDR	Servo axis address
CMD	Function code: 0x06
REGISTER_ADDRH	High byte of written register address
REGISTER_ADDRL	Low byte of written register address
DATA[0]	Write high byte of data
DATA[1]	Write data low byte
CRCL	CRC check code low byte
CRCH	CRC check code high byte
END	Idle time greater than or equal to 3.5 characters, one frame ends

Response frame format：

START	Idle time greater than or equal to 3.5 characters, indicating the start of a frame
ADDR	Servo axis address
CMD	Function code: 0x06
REGISTER_ADDRH	High byte of written register address
REGISTER_ADDRL	Low byte of written register address
DATA[0]	Write high byte of data
DATA[1]	Write data low byte
CRCL	CRC check code low byte
CRCH	CRC check code high byte
END	Idle time greater than or equal to 3.5 characters, one frame ends

Example：

Host sends request frame：

0x01	0x06	0x00	0x64	0x00	0x02	CRCL	CRCH

This request frame means: To the servo Driver whose axis address is 0x01, the register address is 100 (0x0064) to write the data value 0x0002.

Slave response frame：

0x01	0x06	0x00	0x64	0x00	0x02	CRCL	CRCH

This response frame means: the host successfully writes the data into the servo Driver register.

6.2.3 Writing multiple registers：0x10

Request frame format：

START	Idle time greater than or equal to 3.5 characters, indicating the start of a frame
ADDR	Servo axis address
CMD	Function code: 0x10
REGISTER_ADDRH	High byte of the start address of the written register
REGISTER_ADDRL	Low byte of the start address of the written register
DATA_NUMBERH	Need to write the number of registers N (H) high byte
DATA_NUMBERL	Need to write the number of registers N (L) low byte
DATA_LENGTH	Need to write the number of bytes corresponding to the number of registers N*2
DATA[0]	Write high byte of start register data
DATA[1]	Write low byte of start register data
DATA[…]	...
DATA[N*2-1]	Write low byte of last register data
CRCL	CRC check code low byte
CRCH	CRC check code high byte
END	Idle time greater than or equal to 3.5 characters, one frame ends

Response frame format：

START	Idle time greater than or equal to 3.5 characters, indicating the start of a frame
ADDR	Servo axis address
CMD	Function code: 0x10
REGISTER_ADDRH	High byte of the start address of the written register
REGISTER_ADDRL	Low byte of the start address of the written register

DATA_NUMBERH	Need to write the number of registers N (H) high byte
DATA_NUMBERL	Need to write the number of registers N (L) low byte
CRCL	CRC check code low byte
CRCH	CRC check code high byte
END	Idle time greater than or equal to 3.5 characters, one frame ends

Note: The maximum number of registers that can be written at one time is 120.

Example:

Host sends request frame：

0x01	0x10	0x00	0x64	0x00	0x02	0x04	0x12	0x00	0x00	0x52	CRCL	CRCH

This request frame means: To the servo driver with the axis address 0x01, the starting register address is 100 (0x0064) to write 2 (0x0002) word length data (4 bytes), and the write data is 0x1200, 0x0052.

Slave response frame：

0x01	0x10	0x00	0x64	0x00	0x02	CRCL	CRCH

This response frame means: the host successfully writes the data into the servo Driver register.

6.2.4 Error response frame format

START	Idle time greater than or equal to 3.5 characters, indicating the start of a frame
ADDR	Servo axis address
CMD	0x80 + function code
ERROR_CODE	Error code
CRCL	CRC check code low byte
CRCH	CRC check code high byte
END	Idle time greater than or equal to 3.5 characters, one frame ends

Error code

Error code	Coding description
0x01	Illegal function code
0x02	Illegal data address
0x03	Illegal data
0x04	Slave equipment failure

Example：

Host sends request frame：

0x01	0x03	0x00	0x64	0x00	0x02	CRCL	CRCH

This request frame means: read 2 (0x0002) word length data from the servo Driver whose axis address is 0x01 and the start register address is 100 (0x0064).

Slave response frame：

0x01	0x03	0x04	0x01	0x20	0x00	0x59	CRCL

The response frame means: the slave returns 4 bytes (2 words long) of data, and the data content is 0x0120, 0x0059.

If the slave responds as

0x01	0x83	0x02	CRCL	CRCH

The response frame indicates: 0x83 indicates a communication error, and the error code is 0x02

6.2.5 CRC check

The host computer and servo communication must use a consistent CRC check algorithm, otherwise a CRC check error will occur, resulting in communication failure, and the servo Driver will not report the CRC check error. The servo Driver adopts 16-bit CRC, with the low byte in front and the high byte in the back. The CRC function is as follows：

```
unsigned short CalcCRCbyAlgorithm(unsigned char* pDataBuffer, unsigned long usDataLen)
{
const unsigned short POLYNOMIAL = 0xA001;
unsigned short wCrc;
int iBite, iBit;
wCrc = 0xFFFF;
for(iBite = 0; iByte < usDataLen; iBite++)
{
   wCrc ^= *( pDataBuffer + iByte);
   for(iBit = 0; iBit <= 7; iBit++)
     {
     if(wCrc & 0x0001)
        {
      wCrc >>= 1;
      wCrc ^= POLYNOMIAL;
       }
```

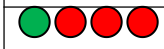
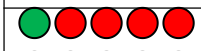
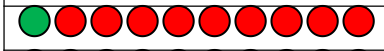
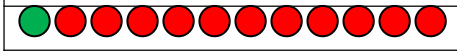
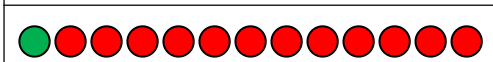
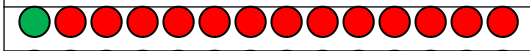
```
      else
      {
         wCrc >>= 1;
            }
   }
}
return wCrc;
}
```

6.3 Use of servo Driver debugging software

Please refer to the software user manual for instructions on the use of the servo Driver debugging software, no additional instructions here

Chapter 7 Troubleshooting

7.1 Fault list

LED State	Illustrate
	Steady green light: the Driver is not enabled
	Green light flashes: the Driver is enabled, normal working state
	1 green, 1 red: Driver overcurrent
	1 green, 2 red: Driver overvoltage
	1 green, 3 red: the internal voltage of the Driver is wrong
	1 green, 4 red: encoder out of tolerance alarm
	1 green, 5 red: Driver undervoltage
	1 green, 6 red: parameter storage error
	1 green, 7 red: abnormal braking (no feedback/timeout)
	1 green, 8 red: encoder failure
	1 green, 9 red: limit input error warning
	1 green, 10 red: motor thermal overload warning
	1 green, 11 red: motor commandoverload warning
	1 green, 12 red: motor output saturation overtime warning
	1 green, 13 red: CAN bus failure
	1 green, 14 red: CAN bus is disconnected
	1 green, 15 red: abnormal software operation
	1 green, 16 red: other undefined faults

7.2 Fault codes

Due to the large number of fault codes, the LED lights cannot fully indicate, and part of the LED indication status is combined with multiple fault codes, resulting in the same error checking. The current fault code can be read through the P13.36 parameter. If there are multiple fault codes, each time this parameter is read, another fault code will be automatically uploaded and cycled. If there is a fault code 121/170, the data read for the first time is 170, the data read for the next time is 121, and the data read for the next time is 170... and so on.

The following table shows the fault content of the fault code：

Fault code	Fault content
AL.000	Normal status
AL.100	Parameter reading error Generally, it occurs after firmware upgrade or parameter reading operation is performed. The version

	of the parameter stored in the EEPROM of the Driver does not match or the verification is wrong. You need to re-import the firmware and save it. An alarm occurs when the Driver has not upgraded the firmware, and the Driver internal parameter reading error is caused. Please completely power off the Driver for 30s, then restart the Driver to check whether there is an alarm. After the operation in step B, the Driver still alarms, please try to restore the factory settings, then power off for 30s, then restart the Driver, if the Driver still alarms, please contact the manufacturer for after-sales or replacement. If there is no alarm, please reset the parameters and continue to use it again.
AL.101	Parameter saving error Appears in the parameter saving process, usually due to abnormal EEPROM chip communication, please completely power off the Driver for 30s, then restart the Driver and perform a parameter saving test. If the warning still appears, please contact the manufacturer for after-sales or replacement.
AL.103	Driver program is running abnormally The Driver program runs abnormally, please contact the manufacturer for after-sales service.
AL.105	Driver program is running abnormally The Driver program runs abnormally, please contact the manufacturer for after-sales service.
AL.110 AL.111	AL.110: Driver IPM module overcurrent AL.111: Driver ADC overcurrent Whether the motor collides with the machine and causes a stall If the motor P06.00, P06.01, P06.02, P06.28, P06.29 are set improperly, try to restore the Driver parameters, and after restarting, check if there is still a warning. If the warning still appears, please contact the manufacturer for after-sales service. By setting the P05.04 parameter, try to reduce the overload multiple of the Driver to test whether there is an alarm.
AL.112 AL.113	AL.112: Motor command overload AL.113: Motor overheated Check whether the motor collides with the machine and causes a stall Check whether the encoder cable is connected correctly, such as: the motor encoder cable is not connected correctly when there are multiple axes Monitor the Driver d03.tF, check the running torque of the motor, and judge whether it is caused by long-term overload
AL.114	Driver IPM module over temperature Check the Driver housing temperature and ventilation and heat dissipation conditions Check if the Driver fan rotates normally
AL.115	Driver internal voltage error The internal voltage failure of the Driver is generally caused by the internal hardware of the Driver. Please contact the manufacturer for after-sales service.
AL.120	Driver encoder interference Please check whether the motor PE wire connection is reliable Check the encoder plug connection is reliable Replace the Driver to check whether the fault is caused by the motor encoder
AL.121	Encoder communication error

	When the fault occurs when the power is turned on, it usually alarms AL.170 at the same time, please check the connection of the encoder extension cable is reliable If the Driver only alarms AL.121, it is usually caused by a malfunction of the encoder, please replace the motor.
AL.123	Encoder CRC check failure
AL.124	Encoder Z phase signal failure
AL.125	Encoder counting failure
AL.126	Encoder disconnection fault A. Check whether the encoder cable is reliably connected
AL.127	Encoder failure Appears during power-on initialization, the incremental encoder reads the Hall signal incorrectly when power-on, and the communication encoder shows that the Driver cannot communicate with the encoder Please check the encoder cable connection is reliable
AL.128	Encoder type setting error Please check if the parameter value of P00.34 is set correctly
AL.129	Encoder data receiving timeout
AL.140	Position error overflow
AL.150	Braking resistance parameter setting is too small
AL.160	FPGA parameter initialization error It appears when the Driver is powering on and initializing, power off the Driver for 30s, then restart it to see if it still alarms, if it still alarms, please replace the Driver.
AL.161	SPI communication error detected by the program Update the Driver and contact the manufacturer for after-sales service.
AL.162	Read encoder EEPROM failure
AL.163	Save the encoder EEPROM failure
AL.164	Encoder data is incorrect It appears during power-on initialization, because the encoder has not been calibrated, please contact the manufacturer for after-sales service.
AL.165	Encoder data is incorrect It occurs during power-on initialization and the encoder's checksum error is caused. Please power off and restart after 30s. If it still alarms, please contact the manufacturer for after-sales or replace the motor.
AL.166	Write encoder EEPROM failure
AL.167	Write encoder EEPROM failure (when read back for verification)
AL.168	Read encoder EEPROM failure
AL.169	Read encoder EEPROM failure
AL.170	Read encoder EEPROM failure It occurs during power-on initialization, usually due to the encoder extension cable. Please check that the extension cable is connected correctly.
AL.171	FPGA initialization error It is caused by abnormal communication between DSP and FPGA during power-on initialization.

AL.200	Control mode setting error Please check the P01.00 parameter setting value, whether it meets the requirements of the manual, or contact the manufacturer.
AL.201	Position command source setting error Please check the P03.00 parameter setting value, whether it meets the requirements of the manual, or contact the manufacturer.
AL.202	Speed command source setting error Please check the P04.00 parameter setting value, whether it meets the requirements of the manual, or contact the manufacturer.
AL.203	Torque command source setting error A. Please check the parameter settings of P05.00, P05.01, and P05.02 to see if they meet the requirements of the manual, or contact the manufacturer.
AL.210	Driver bus voltage is high Please connect the braking resistor or check the quality and resistance of the braking resistor. Please check whether the AC input power is too high and the Driver input power requirement is below 260VAC.
AL.211	Driver bus voltage is low Please check whether the AC input power is indeed too low and the Driver input power requirement is below 170VAC. Replace with a new Driver to check if the Driver is damaged.
AL.212	Driver bus voltage is high It occurs when the bus voltage of the Driver is momentarily higher than the alarm threshold. Please connect the braking resistor or check the quality and resistance of the braking resistor. Please check if it is indeed caused by the high AC input power, the Driver input power requirement is below 260VAC
AL.213	Torque limit alarm output
AL.220	Encoder battery warning When the battery voltage is lower than 3.3V during power-on initialization, please replace the battery in time. Use the AF.CEN function to clear the alarm
AL.221	Encoder battery failure The current encoder battery voltage is lower than 2.8V, please replace the battery The encoder battery is disconnected from the encoder. Use the AF.CEE function to clear the alarm When this alarm occurs, the multi-turn encoder data of the Driver is already incorrect, and the zero point needs to be reset
AL.222	Encoder multi-turn data alarm It occurs during power-on initialization, usually due to the previous disconnection of the encoder battery and the encoder. The battery voltage is too low or the battery connection line is abnormal Use the AF.CEN function to clear the alarm When this alarm occurs, the multi-turn encoder data of the Driver is already incorrect, and the zero point needs to be reset

AL.230	Speeding alarm
AL.231	Speed regulator output saturation Check whether the collision is caused Check whether the parameter settings of P06.00 and P06.01 are correct Check whether the power cable and encoder extension cable are properly connected
AL.240	Location is out of tolerance Check whether the power cord is properly connected Check whether the electronic gear ratio parameter setting is correct Check whether the frequency of pulse input exceeds the maximum speed of the motor
AL.250	Braking without feedback The brake feedback circuit of the Driver is abnormal. Replace the Driver or contact after-sales service.
AL.251	Braking timeout Please connect the braking resistor or check whether the resistance of the braking resistor is normal Please check whether the input AC voltage is within the calibrated working voltage range of the Driver
AL.252	Limit input abnormal Because the positive and negative limits take effect at the same time, please check the limit sensor and its input port polarity settings
AL.253	Braking voltage setting value is too large Please check whether the parameter setting value of P01.27 meets the requirements of the manual
AL.260	Analog input channel 1 zero drift setting is abnormal
AL.261	Analog input channel 2 zero drift setting is abnormal

7.3 **Relationship between LED indication and fault code**

LED indication	LED fault description	Error code
Steady green	Driver is not enabled	0
Flashing green	Driver enable, normal working state	0
1 green 1 red	Driver overcurrent	110、111
1 green 2 red	Driver overvoltage	210、212
1 green 3 red	Driver internal voltage error	115
1 green 4 red	Encoder out of tolerance alarm	140、240、291
1 green 5 red	Driver undervoltage	211
1 green 6 red	Parameter storage error	100、101
1 green 7 red	Braking abnormality (no feedback/timeout)	250、251、253
1 green 8 red	Encoder failure	105、120、121、128、162、163、164、165、166、167、168、169、170、174、175、190、191、220、221、222、
1 green 9 red	Limit input error warning	252
1 green 10 red	Motor thermal overload warning	113
1 green 11 red	Motor command overload warning	112
1 green 12 red	Motor output saturation timeout warning	231

1 green 13 red	CAN bus failure	261、262、263、264
1 green 14 red	CAN bus disconnection	265
1 green 15 red	The software is running abnormally	103
1 green 17 red	Other undefined	Other fault codes

Chapter 8 Appendix

Appendix B List of servo parameters

Group P00 Servo Driver/motor parameters

Parameter number	Name	Predetermined area	Unit	Factory setting	Related patterns
P00.00	Motor number	10000～65535	-	50604	-
P00.01	Servo Driver model	-	-	-	Show
P00.02	MCU software version number	-	-	-	Show
P00.03	FPGA software version	-	-	-	Show
P00.04	EtherCAT software version	-	-	-	Show
P00.05	Driver hardware version	-	-	-	Show
P00.06	CAN software version	-	-	-	Show
P00.07	Software non-standard ID number	-	-	-	Show
P00.08	Hardware non-standard ID number	-	-	-	Show
P00.09	Driver PWM update mode	-	-	-	Show
P00.17	rated power	1～65535	0.01KW	-	-
P00.18	Rated voltage	1～380	V	-	-
P00.19	Rated current	1～65535	0.1A	-	-
P00.20	Rated speed	1～6000	rpm	-	-
P00.21	Maximum speed	1～6000	rpm	-	-
P00.22	Rated torque	1～65535	0.01Nm	-	-
P00.23	Maximum torque	1～65535	0.01Nm	-	-
P00.24	Moment of inertia Jm	1～65535	$kgcm^2$	-	-
P00.25	Number of motor pole pairs	2～360	pole pairs	-	-
P00.26	Stator resistance	1～65535	0.001Ω	-	-
P00.27	Stator inductance Lq	1～65535	0.01mH	-	-
P00.28	Stator inductance Ld	1～65535	0.01mH	-	-
P00.29	Linear back-EMF coefficient	1～65535	0.01mV/rpm		-
P00.30	Torque coefficient Kt	1～65535	0.01Nm/Arms	-	-
P00.31	Electrical time constant Te	1～65535	0.01ms	-	-
P00.32	Mechanical time constant Tm	1～65535	0.01ms	-	-
P00.34	Encoder type	0～4	-	2	-
P00.35 P00.36	Absolute encoder offset	0～1073741824	P	0	-
P00.37	Absolute encoder digits	10～23	位	17	-
P00.38	Incremental encoder pulse number	1000～65535	P/r	10000	-
P00.39	Encoder Z phase signal offset	0～65535	P	1250	-
P00.40	Encoder U phase signal rising edge offset	0～65535	P	0	-
P00.41	Prohibit multi-turn encoder battery fault output	0～1	-	0	-

P00.42	Multi-turn encoder multi-turn bits	0～24	位	16	-
P00.43	Driver power-on position calibration torque	0～100	%	90	-
P00.44	Set current position as mechanical zero	0～1	-	0	-
P00.45 P00.46	Encoder single-turn value corresponding to the mechanical zero of the absolute value system	0～16777216	P	0	-
P00.47 P00.48	The encoder multi-turn value corresponding to the mechanical zero of the absolute value system	-16777216～16777216	Cycle	0	-
P00.49	It is forbidden to use the absolute encoder position to update the current position command	0～1	-	0	-
P00.50 P00.51	Divided output gear ratio numerator	1～8388608	-	10000	-
P00.52 P00.53	Frequency division output gear ratio denominator	1～8388608	-	131072	-
P00.54	Exchange frequency division output AB phase pulse	0～1	-	0	-
P00.55	Encoder EEPROM version number	-	-	-	Show
P00.56	Rotation mode enable/divide frequency output Z phase width	0～1(1～65535)	-	0(8)	-
P00.57	Frequency division output Z phase signal polarity	0～1	-	0	-
P00.58	Frequency division output Z phase initialization mode	0～1	-	0	-

Group P01 Basic control parameters

Parameter number	Name	Predetermined area	Unit	Factory setting	Related patterns
P01.00	Control mode selection	0～7	-	0	-
P01.01	Rotation direction selection	0～1	-	0	-
P01.20	The minimum value of braking resistance allowed by the Driver	-	Ω	-	Show
P01.21	Built-in braking resistor power	-	W	-	Show
P01.22	Built-in braking resistor resistance	-	Ω	-	Show
P01.23	Resistance heat dissipation coefficient	1～100	%	20	-
P01.24	Braking resistance setting	0～1	-	0	-
P01.25	External braking resistor power	1～65535	W	50	-
P01.26	Resistance of external braking resistor	1～1000	Ω	10	-
P01.27	Braking start voltage value	1～100		68	-
P01.28	Brake feedback detection mode (do not set)	0～1		1	-
P01.29	Maximum continuous braking time	1～1000	ms	3000	-
P01.33	Emergency stop deceleration time constant	1～65535	ms	5	-
P01.36	Servo enable delay off time	0～65535	ms	50	-
P01.37	Speed regulator saturation detection time	0～65535	10ms	450	-

P01.42	Instruction overload start detection point	0～300	%	100	-
P01.43	Command overload peak detection point	0～300	%	300	-
P01.44	Command overload detection time	0～65535	10ms	450	-
P01.45	Thermal overload initial detection point	0～300	%	100	-
P01.46	Thermal overload peak detection point	0～300	%	300	-
P01.47	Thermal overload detection time	0～65535	10ms	450	-
P01.48	Overvoltage detection threshold	1～100	V	85	-
P01.49	Undervoltage detection threshold	1～100	V	15	-

Group P02 Terminal input/output parameters

Parameter number	Name	Predetermined area	Unit	Factory setting	Related patterns
P02.00	IN1 terminal function selection	0～31	-	1	-
P02.01	IN1 terminal logic selection	0～1	-	0	-
P02.02	IN2 terminal function selection	0～31	-	5	-
P02.03	IN2 terminal logic selection	0～1	-	0	-
P02.04	IN3 terminal function selection	0～31	-	6	-
P02.05	IN3 terminal logic selection	0～1	-	0	-
P02.06	IN4 terminal function selection	0～31	-	23	-
P02.07	IN4 terminal logic selection	0～1	-	0	-
P02.08	IN5 terminal function selection	0～31	-	0	-
P02.09	IN5 terminal logic selection	0～1	-	0	-
P02.10	IN6 terminal function selection	0～31	-	0	-
P02.11	IN6 terminal logic selection	0～1	-	0	-
P02.12	IN7 terminal function selection	0～31	-	0	-
P02.13	IN7 terminal logic selection	0～1	-	0	-
P02.14	IN8 terminal function selection	0～31	-	0	-
P02.15	IN8 terminal logic selection	0～1	-	0	-
P02.16	IN9 terminal function selection	0～31	-	0	-
P02.17	IN9 terminal logic selection	0～1	-	0	-
P02.32	OUT1 terminal function selection	0～31	-	1	-
P02.33	OUT1 terminal logic selection	0～1	-	0	-
P02.34	OUT2 terminal function selection	0～31	-	6	-
P02.35	OUT2 terminal logic selection	0～1	-	0	-
P02.36	OUT3 terminal function selection	0～31	-	0	-
P02.37	OUT3 terminal logic selection	0～1	-	0	-
P02.52	IN terminal is forcibly effective	0～65535	-	0	-
P02.53	OUT terminal forced effective	0～65535	-	0	-
P02.54 P02.55	FunIN function valid flag	-	-	-	Show

P02.56 P02.57	The rising edge of the FunIN function latches the valid flag	-	-	-	Show
P02.58 P02.59	The falling edge of the FunIN function latches the valid flag	-	-	-	Show
P02.60 P02.61	FunOUT function valid flag	-	-	-	Show
P02.62	Physical output enable	0～65535	-	0	-
P02.63	Physical output status	0～65535	-	0	-

Group P03 Position control parameters

Parameter number	Name	Predetermined area	Unit	Factory setting	Related patterns
P03.00	Position command source	0～10	-	0	P
P03.02	Pulse command type selection	0～3	-	0	P
P03.03	Reserve	-	-	-	-
P03.04	Position command average filter time constant	1～2048	0.1ms	1	P
P03.05	Position command first-order low-pass filter time constant	0～65535	0.1ms	0	P
P03.06 P03.07	Number of position commands for one motor rotation	0～8388608	P/r	10000	P
P03.08 P03.09	Electronic gear ratio numerator 1	1～1073741824	-	1	P
P03.10 P03.11	Electronic gear ratio denominator 1	1～1073741824	-	1	P
P03.12 P03.13	Electronic gear ratio numerator 2	1～1073741824	-	1	P
P03.14 P03.15	Electronic gear ratio denominator 2	1～1073741824	-	1	P
P03.20	In-position signal establishment time	0～65535	0.1ms	10	P
P03.21	Position command stop detection time	0～65535	0.1ms	10	P
P03.22	Positioning completion threshold	1～65535	Coding unit	10	P
P03.23	Clear position deviation action selection	0～1	-	0	P
P03.24	Position deviation fault detection prohibited	0～1	-	0	P
P03.25 P03.26	Position deviation fault detection threshold	1～1073741824	Coding unit	1310720	P
P03.27	Reserve	-	-	-	-
P03.28	Stepping operation command pulse number	-1073741824～1073741824	Instruction unit	10000	P
P03.30	Stepping speed	0～6000	rpm	1000	P
P03.31	Stepping operation acceleration time constant	1～65535	1ms	200	P
P03.32	Stepping operation deceleration time constant	1～65535	1ms	200	P
P03.40	Home position return enable control	0～6	-	1	P
P03.41	Home position return mode selection	0～13	-	0	P
P03.42	High-speed search for the speed of the origin switch signal	0～3000	rpm	100	P
P03.43	Low speed search origin switch signal speed	0～1000	rpm	50	P
P03.44	Search for the acceleration and deceleration time constant of the zero switch signal	1～65535	ms	100	P

P03.45	Reserve	-	-	-	-
P03.46 P03.47	Machine origin offset	-1073741824～1073741824	-	0	P
P03.49	Mechanical origin offset and limit processing method	0～3	-	0	P
P03.50	Threshold for the time to return to zero when touched down	0～65535	ms	100	P
P03.51	Threshold for the speed of zero return to zero when touched down	0～1000	rpm	10	P
P03.52	Touch stop and return to zero torque limit	0～100	%	50	P
P03.53	Communication control position command type	0～1	-	0	P
P03.54	Communication control acceleration time constant	1～65535	ms	100	P
P03.55	Communication control deceleration time constant	1～65535	ms	100	P
P03.56	Communication control operating speed	0～6000	rpm	500	P
P03.57 P03.58	Communication control position command	-1073741824～1073741824	Instruction unit	10000	P

Group P04 Speed control parameters

Parameter number	Name	Predetermined area	Unit	Factory setting	Related patterns
P04.00	Speed command source selection	0～10	-	0	S
P04.01	Speed command digital set value	-6000～6000	rpm	1000	S
P04.02	Analog input channel settings	0～1	-	0	S
P04.04	Jog speed setting value	0～6000	rpm	1000	S
P04.05	Speed command acceleration time constant	1～65535	ms	200	S
P04.06	Speed command deceleration time constant	1～65535	ms	200	S
P04.07	Zero speed clamp speed threshold	0～3000	rpm	10	S
P04.14	Speed reaches the detection threshold	0～6000	rpm	1000	S
P04.15	Reserve	-	-	-	-
P04.16	Speed mode jog forward speed	0～6000	rpm	200	S
P04.17	Speed mode jog reversal speed	0～6000	rpm	200	S
P04.18	Speed mode jog acceleration time constant	1～65535	ms	100	S
P04.19	Speed mode jog deceleration time constant	1～65535	ms	100	S
P04.20	Position mode jog forward speed	0～6000	rpm	200	S
P04.21	Position mode jog reversal speed	0～6000	rpm	200	S
P04.22	Position mode jog acceleration time constant	1～65535	ms	100	S
P04.23	Position mode jog deceleration time constant	1～65535	ms	100	S
P04.24 P04.25	Fixed-length stroke in position mode	0～1073741824	Instruction unit	10000	P
P04.60	Communication control command pulse number	0～1073741824	P	50000	S
P04.62	Communication control speed	0～6000	rpm	1000	S

P04.63	Communication control acceleration time constant	1～65535	ms	200	S
P04.64	Communication control deceleration time constant	1～65535	ms	200	S
P04.65	Communication control operation mode	0～1	-	0	S
P04.66	Communication control operation start direction	0～1	-	0	S
P04.67	Communication control operation times	0～65535	-	0	S
P04.68	Open loop running speed	0～3000	rpm	100	-
P04.69	Open loop running acceleration	1～100	r/s^2	10	-
P04.70	Open loop running deceleration	1～100	r/s^2	10	-
P04.71	Open loop operating torque	0～100	%	50	-
P04.72	Open loop operation start and stop instructions	0～6	-	0	-
P04.73	Lock shaft position	0～65535	-	0	-
P04.74	Lock shaft torque	0～100	%	50	-
P04.75	Lock shaft start and stop command	0～1	-	0	-
P04.76	Encoder calibration speed	1～100	rpm	10	-
P04.77	Encoder calibration acceleration	1～10	r/s^2	1	-
P04.78	Encoder calibration deceleration	1～10	r/s^2	1	-
P04.79	Encoder calibration torque	0～100	%	85	-
P04.80	Encoder calibration start instruction	0～1	-	0	-
p04.81	Encoder receiving insufficient data fault counter	-	-	-	Show
P04.82	Encoder receiving disconnection fault counter	-	-	-	Show
P04.83	Encoder receiving CRC failure counter	-	-	-	Show
P04.84	Encoder receiver module failure counter	-	-	-	Show
P04.85	Encoder receiving continuous fault counter	-	-	-	Show

Group P05 Torque control parameters

Parameter number	Name	Predetermined area	Unit	Factory setting	Related patterns
P05.00	Torque command source A	0～2	-	0	T
P05.01	Torque command source B	0～2	-	0	T
P05.02	Torque command source	0～3	-	0	T
P05.03	Torque command digital set value	-3000～3000	0.1%	200	T
P05.04	Driver overload factor	0～3000	0.1%	3000	T
P05.05	Torque ramp	1～65535	0.1%/s	3000	T
P05.06	Torque limit source (reserved)	0～4	-	0	T
P05.07	Torque limit source AI channel (reserved)	0～1	-	0	T
P05.08	Internal forward torque limit (reserved)	0～3000	0.1%	3000	T
P05.09	Internal negative torque limit (reserved)	0～3000	0.1%	3000	T
P05.10	External forward torque limit	0～3000	0.1%	3000	T

	(reserved)				
P05.11	External negative torque limit (reserved)	0～3000	0.1%	3000	T
P05.12	Source of speed limit	0～1	-	0	T
P05.13	Speed limit analog channel source (reserved)	0～1	-	0	T
P05.14	Torque control forward speed limit value	0～6000	rpm	3000	T
P05.15	Torque control negative speed limit value	0～6000	rpm	0	T
P05.16	Torque reaches the reference value	0～65535	0.1%	0	T
P05.17	Torque reaches effective value	0～65535	0.1%	100	T
P05.18	Torque reaches invalid value	0～65535	0.1%	50	T
P05.19	Effective detection time of torque arrival signal	0～65535	Ms	50	T
P05.20	Communication given torque command	0～3000	0.1%	200	T
P05.21	Torque running acceleration time constant	1～65535	ms	100	T
P05.22	Torque running deceleration time constant	1～65535	ms	100	T
P05.23	Torque holding time	0～65535	ms	500	T
P05.24	Working mode after torque is reached	0～3	-	0	T
P05.25	Communication triggers torque operation	0～2	-	0	T
P05.33	Torque limit detection time (reserved)	0～65535	-	0	T
P05.34	Reserve	-	-	-	T
P05.35	Reserve	-	-	-	T
P05.36	Reserve	-	-	-	T
P05.37	Reserve	-	-	-	T

Group P06 Gain parameters

Parameter number	Name	Predetermined area	Unit	Factory setting	Related patterns
P06.00	1st speed gain	0～65535	0.1Hz	4500	-
P06.01	1st speed integral time constant	1～30000	0.1ms	3500	-
P06.02	1st position gain	0～5000	0.1Hz	500	-
P06.03	2nd speed gain	0～65535	0.1Hz	4500	-
P06.04	2nd speed integral time constant	1～30000	0.1ms	3500	-
P06.05	2nd position gain	0～5000	0.1Hz	500	-
P06.06	Skd	0～65535	-	0	-
P06.07	Skr	0～65535	-	1000	-
P06.08	Skm	0～65535	-	0	-
P06.09	Pki	0～65535	-	0	-
P06.10	Pkd	0～65535	-	0	-
P06.14	Speed feedforward low-pass filter cut-off frequency	0～10000	Hz	2000	-
P06.15	Speed feedforward gain	0～1000	0.1%	0	-
P06.16	Torque feedforward low-pass	0～10000	Hz	2000	-

	filter cut-off frequency				
P06.17	Torque feedforward gain	0～1000	0.1%	0	-
P06.18	Reserve	-	-	-	-
P06.19	Speed low pass filter cut-off frequency 1	0～10000	Hz	1000	-
P06.20	Speed low pass filter cut-off frequency 2	0～10000	Hz	2000	-
P06.21	Reserve	-	-	-	-
P06.24	Torque command low-pass filter cut-off frequency 1	0～10000	Hz	1000	-
P06.25	Reserve	-	-	-	-
P06.26	Torque fe 递四方的来了 edback low-pass filter cut-off frequency 1	0～10000	Hz	1000	-
P06.27	Reserve	-	-	-	-
P06.28	Current loop proportional gain	0～50000	Hz	1000	-
P06.29	Current loop integral time constant	0～10000	0.1ms	1500	-
P06.30	PVIA proportional gain KP	0～50000	-	3000	-
P06.31	PVIA integral gain KI	0～10000	-	1000	-
P06.32	PVIA speed gain KV1	0～50000	-	1000	-
P06.33	PVIA speed gain KV2	0～50000	-	100	-
P06.34	PVIA acceleration gain KA	0～50000	-	0	-
P06.35	PVIA speed gain KVFF	0～50000	-	1000	-
P06.36	PVIA acceleration gain KAFF	0～50000	-	0	-
P06.37	PVIA command speed low-pass filter cut-off frequency	1～10000	Hz	1000	-
P06.38	PVIA command acceleration low-pass filter cut-off frequency	1～10000	Hz	2000	-
P06.39	PVIA feedback acceleration low-pass filter cut-off frequency	1～10000	Hz	2000	-
P06.40	PVIA enable control	0～25	-	0	-
P06.45	Reserve	-	-	-	-
P06.46	Reserve	-	-	-	-
P06.47	Reserve	-	-	-	-
P06.48	Reserve	-	-	-	-
P06.49	Reserve	-	-	-	-
P06.50	Reserve	-	-	-	-
P06.51	Reserve	-	-	-	-
P06.52	Reserve	-	-	-	-
P06.53	Reserve	-	-	-	-

Group P08 Communication parameters

Parameter number	Name	Predetermined area	Unit	Factory setting	Related patterns
P08.00	RS485 communication axis address	1～247	-	1	-
P08.01	RS485 communication serial port baud rate selection	0～5	-	5	-
P08.02	RS485 communication data format selection	0～5	-	0	-

P08.05	CAN communication axis address	1～127	-	2	-
P08.06	CAN communication baud rate selection	0～6	-	4	-
P08.07	CAN disconnection detection time	0～65535	ms	0	-
P08.08	Station address assigned by the EtherCAT host	-	-	-	Show
P08.09	Display the current site alias address of the Driver	-	-	-	Show
P08.10	Set the EtherCAT communication station of the Driver	0～65535	-	0	-
P08.30	RS232 communication axis address	Show	-	1	-
P083.31	RS232 communication serial port baud rate selection	0～5	-	5	-
P08.32	RS323 communication data format selection	0～5	-	0	-

Group P09 Multi-segment position parameters

Parameter number	Name	Predetermined area	Unit	Factory setting	Related patterns
P09.00	Multi-stage position operation mode	0～2	-	1	P
P09.01	Number of end segments of position command	0～16	-	1	P
P09.03	Time unit selection	0～1	-	0	P
P09.04	Position command type selection	0～1	-	0	P
P09.12 P09.13	1st position command	-1073741824～1073741824	Instruction unit	10000	P
P09.14	Maximum operating speed of stage 1	1～6000	rpm	200	P
P09.15	1st stage position command acceleration/deceleration time constant	1～65535	ms	100	P
P09.16	Waiting time after the completion of the first segment position command	0～65535	ms(s)	100	P
P09.17 P09.18	2nd position command	-1073741824～1073741824	Instruction unit	10000	P
P09.19	Maximum operating speed of stage 2	1～6000	rpm	200	P
P09.20	2nd stage position command acceleration and deceleration time constant	1～65535	ms	100	P
P09.21	Waiting time after the completion of the second position command	0～65535	ms(s)	100	P
P09.22 P09.23	3rd position command	-1073741824～1073741824	Instruction unit	10000	P
P09.24	Maximum operating speed of stage 3	1～6000	rpm	200	P
P09.25	3rd step position command acceleration and deceleration time constant	1～65535	ms	100	P
P09.26	Waiting time after the completion of the 3rd position command	0～65535	ms(s)	100	P
P09.27 P09.28	4th position command	-1073741824～1073741824	Instruction unit	10000	P
P09.29	Maximum operating speed of stage 4	1～6000	rpm	200	P
P09.30	The 4th step position command acceleration and deceleration	1～65535	ms	100	P

	time constant				
P09.31	Waiting time after the completion of the 4th position command	0～65535	ms(s)	100	P
P09.32 P09.33	5th position command	-1073741824～1073741824	Instruction unit	10000	P
P09.34	Maximum operating speed of stage 5	1～6000	rpm	200	P
P09.35	5th step position command acceleration and deceleration time constant	1～65535	ms	100	P
P09.36	Waiting time after the completion of the 5th position command	0～65535	ms(s)	100	P
P09.37 P09.38	6th position command	-1073741824～1073741824	Instruction unit	10000	P
P09.39	Maximum operating speed of stage 6	1～6000	rpm	200	P
P09.40	The 6th stage position command acceleration and deceleration time constant	1～65535	ms	100	P
P09.41	Waiting time after the completion of the 6th position command	0～65535	ms(s)	100	P
P09.42 P09.43	7th position command	-1073741824～1073741824	Instruction unit	10000	P
P09.44	Maximum operating speed of stage 7	1～6000	rpm	200	P
P09.45	7th stage position command acceleration and deceleration time constant	1～65535	ms	100	P
P09.46	Waiting time after the completion of the 7th segment position command	0～65535	ms(s)	100	P
P09.47 P09.48	8th position command	-1073741824～1073741824	Instruction unit	10000	P
P09.49	Maximum operating speed of section 8	1～6000	rpm	200	P
P09.50	8th step position command acceleration and deceleration time constant	1～65535	ms	100	P
P09.51	Waiting time after the 8th segment position command is completed	0～65535	ms(s)	100	P
P09.52 P09.53	9th position command	-1073741824～1073741824	Instruction unit	10000	P
P09.54	Maximum operating speed of stage 9	1～6000	rpm	200	P
P09.55	9th stage position command acceleration and deceleration time constant	1～65535	ms	100	P
P09.56	Waiting time after the 9th segment position command is completed	0～65535	ms(s)	100	P
P09.57 P09.58	10th position command	-1073741824～1073741824	Instruction unit	10000	P
P09.59	10th stage maximum operating speed	1～6000	rpm	200	P
P09.60	10th stage position command acceleration and deceleration time constant	1～65535	ms	100	P
P09.61	Waiting time after the completion of the 10th position command	0～65535	ms(s)	100	P
P09.62 P09.63	11th position command	-1073741824～1073741824	Instruction unit	10000	P
P09.64	11th stage maximum operating speed	1～6000	rpm	200	P
P09.65	The 11th step position command acceleration and	1～65535	ms	100	P

	deceleration time constant				
P09.66	Waiting time after the completion of the 11th position command	0～65535	ms(s)	100	P
P09.67 P09.68	12th position command	-1073741824～1073741824	Instruction unit	10000	P
P09.69	12th stage maximum operating speed	1～6000	rpm	200	P
P09.70	12th stage position command acceleration and deceleration time constant	1～65535	ms	100	P
P09.71	Waiting time after the completion of the 12th position command	0～65535	ms(s)	100	P
P09.72 P09.73	13th position command	-1073741824～1073741824	Instruction unit	10000	P
P09.74	13th stage maximum operating speed	1～6000	rpm	200	P
P09.75	13th stage position command acceleration and deceleration time constant	1～65535	ms	100	P
P09.76	Waiting time after the completion of the 13th position command	0～65535	ms(s)	100	P
P09.77 P09.78	14th position command	-1073741824～1073741824	Instruction unit	10000	P
P09.79	Maximum operating speed of stage 14	1～6000	rpm	200	P
P09.80	The 14th step position command acceleration and deceleration time constant	1～65535	ms	100	P
P09.81	Waiting time after the 15th segment position command is completed	0～65535	ms(s)	100	P
P09.82 P09.83	15th position command	-1073741824～1073741824	Instruction unit	10000	P
P09.84	15th stage maximum operating speed	1～6000	rpm	200	P
P09.85	15th stage position command acceleration and deceleration time constant	1～65535	ms	100	P
P09.86	Waiting time after the 15th segment position command is completed	0～65535	ms(s)	100	P
P09.87 P09.88	16th position command	-1073741824～1073741824	Instruction unit	10000	P
P09.89	Maximum operating speed of stage 16	1～6000	rpm	200	P
P09.90	16th stage position command acceleration and deceleration time constant	1～65535	ms	100	P
P09.91	Waiting time after the 16th segment position command is completed	0～65535	ms(s)	100	P

Group P10 Multi-segment speed parameters

Parameter number	Name	Predetermined area	Unit	Factory setting	Related patterns
P10.00	Multi-stage speed command operation mode	0～2	-	1	S
P10.01	Speed command end point number	0～16	-	16	S
P10.02	Running time unit	0～1	-	0	S
P10.03	Acceleration time constant 1	1～65535	ms	200	S

P10.04	Deceleration time constant 1	1～65535	ms	200	S
P10.05	Acceleration time constant 2	1～65535	ms	200	S
P10.06	Deceleration time constant 2	1～65535	ms	200	S
P10.07	Acceleration time constant 3	1～65535	ms	200	S
P10.08	Deceleration time constant 3	1～65535	ms	200	S
P10.09	Acceleration time constant 4	1～65535	ms	200	S
P10.10	Deceleration time constant 4	1～65535	ms	200	S
P10.11	Acceleration time constant 5	1～65535	ms	200	S
P10.12	Deceleration time constant 5	1～65535	ms	200	S
P10.13	Acceleration time constant 6	1～65535	ms	200	S
P10.14	Deceleration time constant 6	1～65535	ms	200	S
P10.15	Acceleration time constant 7	1～65535	ms	200	S
P10.16	Deceleration time constant 7	1～65535	ms	200	S
P10.20	1st stage speed command	-6000～6000	rpm	100	S
P10.21	1st stage speed command running time	0～65535	0.1sec 0.1min	10	S
P10.22	1st stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.23	2nd stage speed command	-6000～6000	rpm	200	S
P10.24	2nd stage speed command running time	0～65535	0.1sec 0.1min	20	S
P10.25	2nd stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.26	3rd speed command	-6000～6000	rpm	300	S
P10.27	3rd stage speed command running time	0～65535	0.1sec 0.1min	30	S
P10.28	3rd stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.29	4th speed command	-6000～6000	rpm	400	S
P10.30	Running time of the 4th speed command	0～65535	0.1sec 0.1min	40	S
P10.31	4th stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.32	5th speed command	-6000～6000	rpm	500	S
P10.33	5th step speed command running time	0～65535	0.1sec 0.1min	50	S
P10.34	5th stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.35	6th speed command	-6000～6000	rpm	600	S
P10.36	6th speed command running time	0～65535	0.1sec 0.1min	60	S
P10.37	6th stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.38	7th speed command	-6000～6000	rpm	700	S
P10.39	7th stage speed command running time	0～65535	0.1sec 0.1min	70	S
P10.40	7th stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.41	8th speed command	-6000～6000	rpm	800	S

P10.42	8th speed command running time	0～65535	0.1sec 0.1min	80	S
P10.43	8th stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.44	9th speed command	-6000～6000	rpm	900	S
P10.45	9th stage speed command running time	0～65535	0.1sec 0.1min	90	S
P10.46	9th stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.47	10th speed command	-6000～6000	rpm	1000	S
P10.48	10th speed command running time	0～65535	0.1sec 0.1min	100	S
P10.49	10th stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.50	11th speed command	-6000～6000	rpm	1100	S
P10.51	11th speed command running time	0～65535	0.1sec 0.1min	110	S
P10.52	11th stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.53	12th speed command	-6000～6000	rpm	1200	S
P10.54	The 12th speed command running time	0～65535	0.1sec 0.1min	120	S
P10.55	12th stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.56	13th speed command	-6000～6000	rpm	1300	S
P10.57	13th step speed command running time	0～65535	0.1sec 0.1min	130	S
P10.58	13th stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.59	14th speed command	-6000～6000	rpm	1400	S
P10.60	14th step speed command running time	0～65535	0.1sec 0.1min	140	S
P10.61	The 14th stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.62	15th speed command	-6000～6000	rpm	1500	S
P10.63	15th segment speed command running time	0～65535	0.1sec 0.1min	150	S
P10.64	15th stage acceleration and deceleration time constant selection	1～7	-	1	S
P10.65	16th speed command	-6000～6000	rpm	1600	S
P10.66	The 16th step speed command running time	0～65535	0.1sec 0.1min	160	S
P10.67	16th stage acceleration and deceleration time constant selection	1～7	-	1	S

Group P11 Auxiliary display

Parameter number	Name	Predetermined area	Unit	Factory setting	Related patterns
P11.00	0x603F (error code)	-	-	-	Show
P11.01	0x6040 (control word)	-	-	-	Show

P11.02	0x6041 (status word)	-	-	-	Show
P11.03	0x605A (selection of quick stop mode)	-	-	-	Show
P11.04	0x605B (shutdown mode selection)	-	-	-	Show
P11.05	0x605C (Prohibition of operation mode selection)	-	-	-	Show
P11.06	0x605E (selection of failure shutdown mode)	-	-	-	Show
P11.07	0x6060 (mode selection)	-	-	-	Show
P11.08	0x6061 (operation mode display)	-	-	-	Show
P11.09 P11.10	0x6062 (position command)	-	Instruction unit	-	Show
P11.11 P11.12	0x6063 (position feedback)	-	Encoder unit	-	Show
P11.13 P11.14	0x6064 (position feedback)	-	Instruction unit	-	Show
P11.15 P11.16	0x6065 (position deviation too large threshold)	-	Instruction unit	-	Show
P11.17	0x6066 (Position deviation time window)	-	ms	-	Show
P11.18 P11.19	0x6067 (position reached threshold)	-	Instruction unit	-	Show
P11.20	0x6068 (position arrival time window)	-	ms	-	Show
P11.21 P11.22	0x606C (speed feedback)	-	Command unit/s	-	Show
P11.23	0x606D (speed reaches the threshold)	-	rpm	-	Show
P11.24	0x606E (speed arrival time window)	-	ms	-	Show
P11.25	0x6071 (target torque)	-	0.1%	-	Show
P11.26	0x6072 (maximum torque)	-	01%	-	Show
P11.27	0x6073 (maximum current)	-	0.1%	-	Show
P11.28	0x6074 (internal target torque)	-	0.1%	-	Show
P11.29	0x6077 (Torque feedback)	-	0.1%	-	Show
P11.30 P11.31	0x607A (target position)	-	Instruction unit	-	Show
P11.32 P11.33	0x607C (origin offset)	-	Instruction unit	-	Show
P11.34 P11.35	0x607D_1 (minimum software absolute position limit)	-	Instruction unit	-	Show
P11.36 P11.37	0x607D_2 (Maximum software absolute position limit)	-	Instruction unit	-	Show
P11.38	0x607E (command polarity)	-	-	-	Show
P11.39 P11.40	0x607F (maximum contour speed)	-	Command unit/s	-	Show
P11.41 P11.42	0x6081 (contour speed)	-	Command unit/s	-	Show
P11.43 P11.44	0x6083 (contour acceleration)	-	Command unit/s2	-	Show
P11.45 P11.46	0x6084 (contour deceleration)	-	Command unit/s2	-	Show
P11.47 P11.48	0x6085 (rapid stop deceleration)	-	Command unit/s2	-	Show
P11.49 P11.50	0x6087 (torque ramp)	-	0.1%/s	-	Show
P11.51 P11.52	0x6091_1 (Gear ratio numerator/motor resolution)	-	-	-	Show
P11.53 P11.54	0x6091_2 (Gear ratio denominator/shaft resolution)	-	-	-	Show
P11.55	0x6098 (return to zero mode)	-	-	-	Show
P11.56 P11.57	0x6099_1 (search for signal speed of deceleration point)	-	Command unit/s	-	Show
P11.58 P11.59	0x6099_2 (Search origin signal speed)	-	Command unit/s	-	Show

P11.60 P11.61	0x609A (zero acceleration)	-	Command unit/s2	-	Show
P11.62 P11.63	0x60B0 (position offset)	-	Instruction unit	-	Show
P11.64 P11.65	0x60B1 (speed offset)	-	Command unit/s	-	Show
P11.66	0x60B2 (torque bias)	-	0.1%	-	Show
P11.67	0x60B8 (probe function)	-	-	-	Show
P11.68	0x60B9 (probe status)	-	-	-	Show
P11.69 P11.70	0x60BA (probe 1 rising edge position feedback)	-	Instruction unit	-	Show
P11.71 P11.72	0x60BB (Probe 1 falling edge position feedback)	-	Instruction unit	-	Show
P11.73 P11.74	0x60BC (probe 2 rising edge position feedback)	-	Instruction unit	-	Show
P11.75 P11.76	0x60BD (Probe 2 falling edge position feedback)	-	Instruction unit	-	Show
P11.77	0x60D5 (probe 1 rising edge counter)	-	-	-	Show
P11.78	0x60D6 (Probe 1 falling edge counter)	-	-	-	Show
P11.79	0x60D7 (probe 2 rising edge counter)	-	-	-	Show
P11.80	0x60D8 (Probe 2 falling edge counter)	-	-	-	Show
P11.81	0x60E0 (maximum forward torque limit)	-	0.1%	-	Show
P11.82	0x60E1 (Maximum torque limit in negative direction)	-	0.1%	-	Show
P11.83 P11.84	0x60F4 (position deviation)	-	Instruction unit	-	Show
P11.85 P11.86	0x60FC (position command)	-	Instruction unit	-	Show
P11.87 P11.88	0x60FD (digital input)	-	-	-	Show
P11.89 P11.90	0x60FE_1 (physical output enable)	-	-	-	Show
P11.91 P11.92	0x60FE_2 (physical output status)	-	-	-	Show
P11.93 P11.94	0x60FF (target speed)	-	Command unit/s	-	Show
P11.95 P11.96	0x6052 (supported servo operation mode)	-	-	-	Show

Group P12 Auxiliary functions

Parameter number	Name	Predetermined area	Unit	Factory setting	Related patterns
P12.00	Save parameters to the EEPROM of the Driver	0～1	-	0	-
P12.01	Read parameters from the EEPROM of the Driver	0～1	-	0	-
P12.02	Restore factory default parameter values	0～1	-	0	-
P12.03	Reset Driver failure	0～1	-	0	-
P12.04	Reserve	-	-	-	-
P12.05	Reset the encoder multi-turn value	0～1	-	0	-
P12.06	Reset the encoder multi-turn value and fault	0～1	-	0	-
P12.07	Reset Driver	0～1	-	0	-
P12.08	Reset fault record	0～1	-	0	-
P12.09	Communication control operation position command type	0～1	-	0	-

P12.10	Communication control operation start/stop command	0～6	-	6	-
P12.11	Reserve	-	-	-	-
P12.12	Communication control demonstration running delay time	0～65535	-	100	-
P12.13	Communication control demonstration operation start/stop instruction	0～2	-	0	-
P12.14	Clear position error	0～1	-	0	-
P12.15	Reserve	-	-	0	-
P12.16	Data sampling channel 1	0～65535	-	0	-
P12.17	Data sampling channel 2	0～65535	-	0	-
P12.18	Data sampling interval	0～65535	-	0	-
P12.19	Data sampling start flag	0～1	-	0	-
P12.20	Save motor related parameters to encoder EEPROM	0～2	-	0	-
P12.21	Test energy consumption braking action and feedback	0～2	-	0	-

Group P13 Monitoring parameters

Parameter number	Name	Predetermined area	Unit	Factory setting	Related patterns
P13.00	Operating status	-	-	-	Show
P13.01	Motor speed	-	rpm	-	Show
P13.02	Speed command	-	rpm	-	Show
P13.03	Motor torque	-	%	-	Show
P13.04	Torque command	-	%	-	Show
P13.05	Operating current	-	%	-	Show
P13.07 P13.08	Position command counter	-	Instruction unit	-	Show
P13.09 P13.10	Position command counter*	-	Encoder unit	-	Show
P13.11 P13.12	Position feedback counter	-	Coding unit	-	Show
P13.13 P13.14	Position deviation counter	-	Instruction unit	-	Show
P13.15 P13.16	Position deviation counter	-	Coding unit	-	Show
P13.17	Position command speed	-	rpm	-	Show
P13.18	Position command frequency	-	KHz	-	Show
P13.19	Input signal monitoring	-	-	-	Show
P13.20	Output signal monitoring	-	-	-	Show
P13.21 P13.22	The current mechanical angle of the motor	-	Encoder unit	-	Show
P13.23	The current electrical angle of the motor	-	Spend	-	Show
P13.24	The current voltage value of the Driver	-	0.1V	-	Show
P13.25 P13.26	Encoder status register	-	-	-	Show
P13.27 P13.28	External pulse counter	-	Instruction unit	-	Show
P13.29	Divided output pulse count	-	Instruction unit	-	Show

P13.30 P13.31	Current position of the motor	-	Instruction unit	-	Show
P13.32 P13.33	target location	-	Instruction unit	-	Show
P13.36	Error code	-	-	-	Show
P13.40 P13.41	Motor encoder single-turn value	-	Encoder unit	-	Show
P13.42 P13.43	Motor encoder multi-turn value	-	lock up	-	Show