DRV Series Servo

CAN Fieldbus 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
2021.07	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
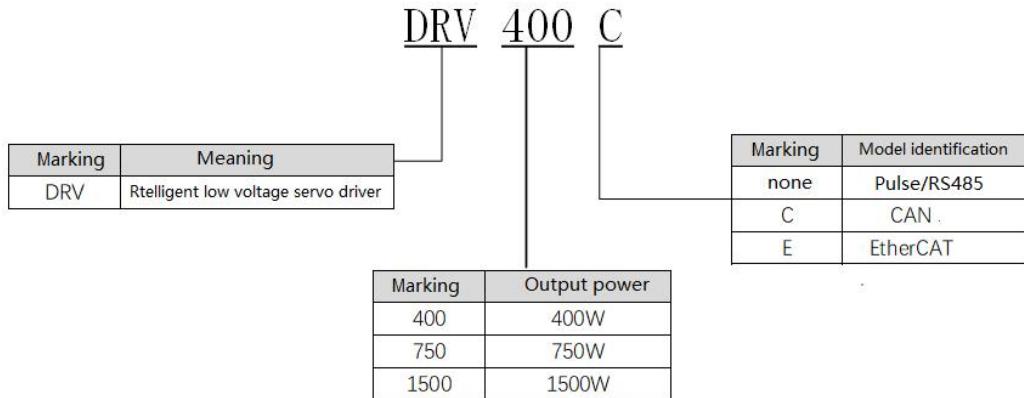
2.1.2 Servo driver specifications

Item	Description		
Driver model	DRV400C	DRV750C	DRV1500C
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:

正面安装   侧面安装
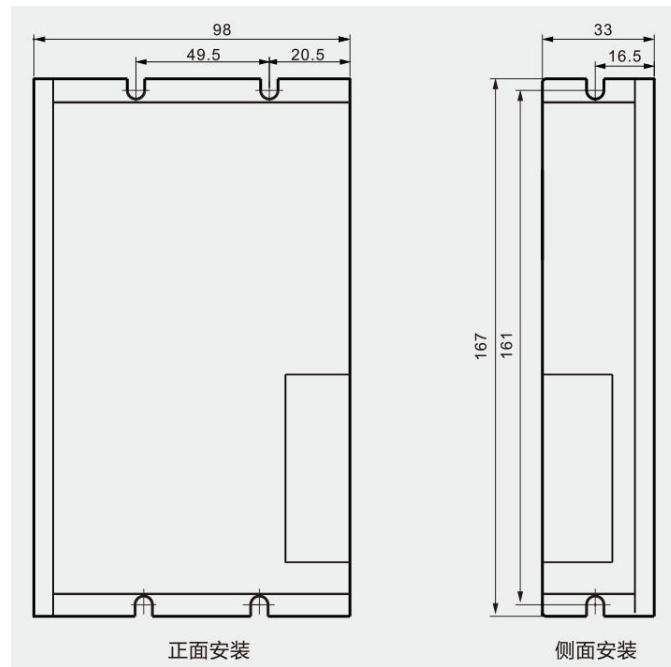
Dimensions of DRV1500/DRV1500C/DRV1500E:

正面安装   侧面安装
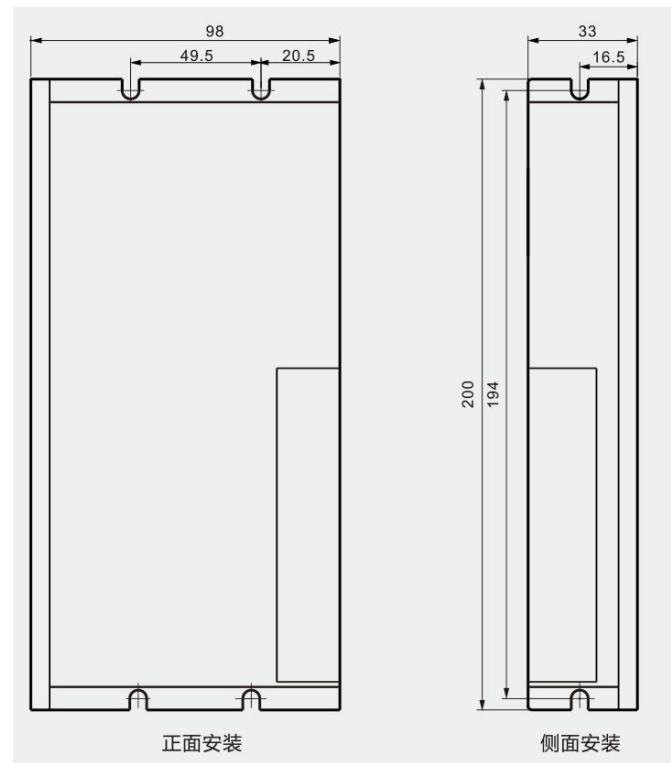
2.2.2 Installation site

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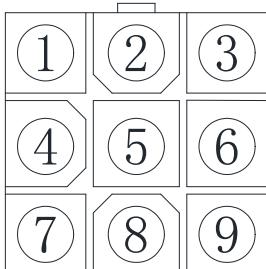
GND	3	Power input negative: 0V
SD+	4	Encoder bus signal
SD-	5	
E+	6	Encoder battery
E-	7	

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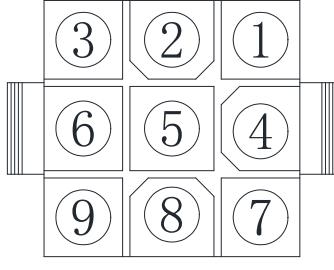
Servo encoder extension cable driver-side terminal: The servo encoder extension cable driver-side terminal is a soldered pin, and the pin number is marked on it. The definition number of the terminal is shown in the following diagram:

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
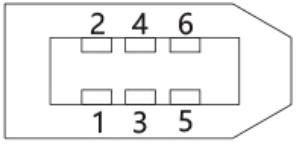
3.3 Servo driver control signal terminal X3 connection

3.3.1 Position command input signal

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

信号 Name	针脚号	功能

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
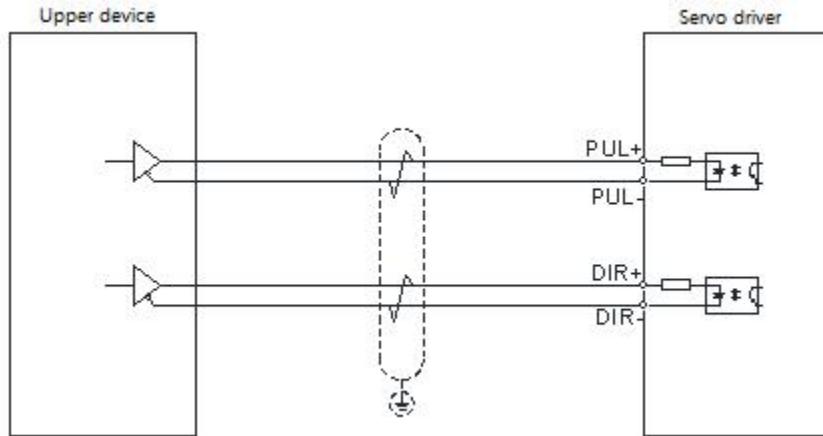
（2） Single-ended common anode signal
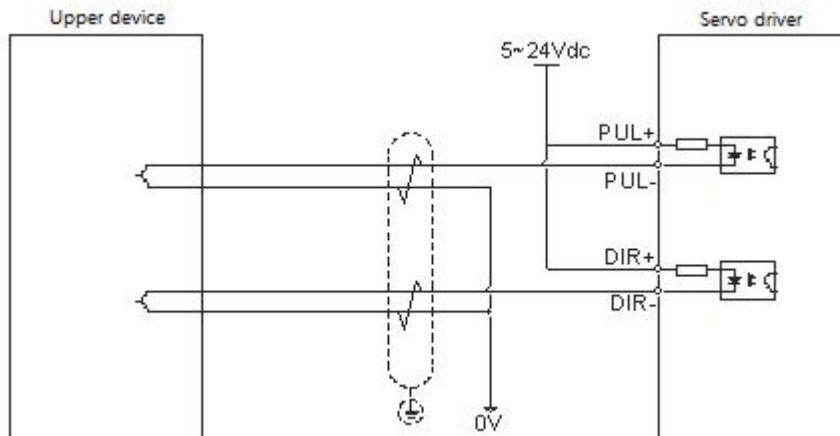
（3） Single-ended common cathode signal
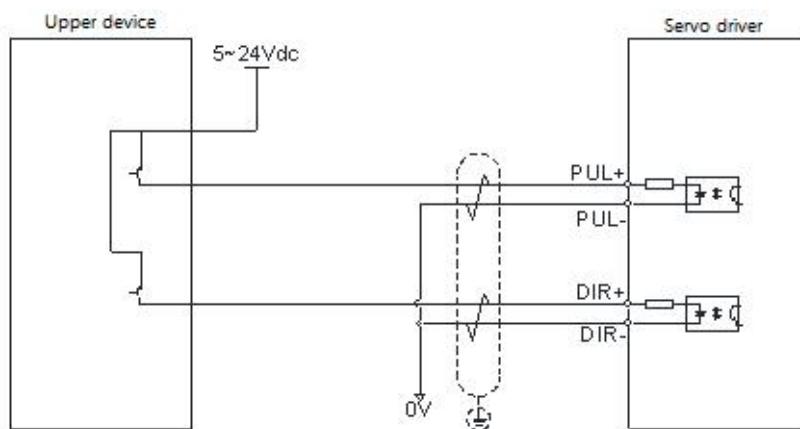
3.3.2 Digital input signal

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:
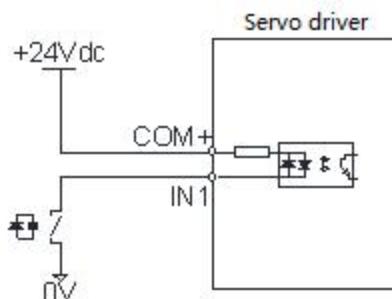
2）When the upper computer device is open-collector output:
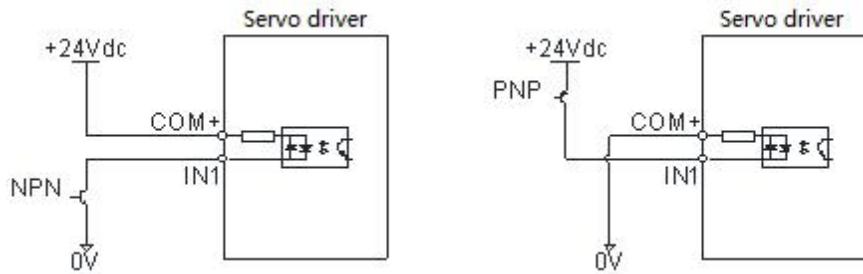
Note: Mixing of NPN and PNP is not supported

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::
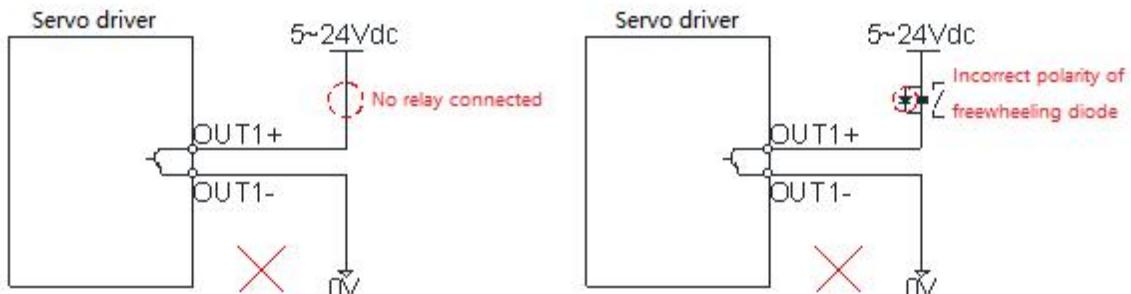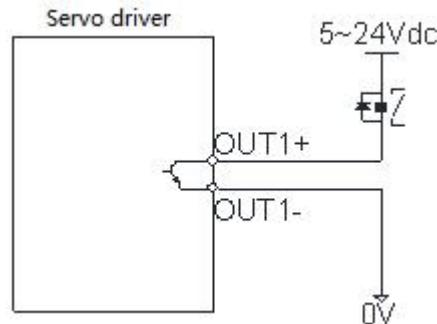
2）When the upper device is optocoupler input:
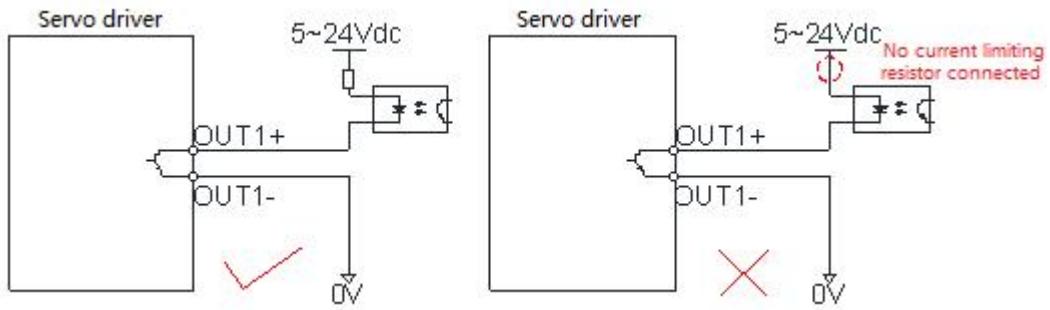
3.3.4 Brake output signal

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	
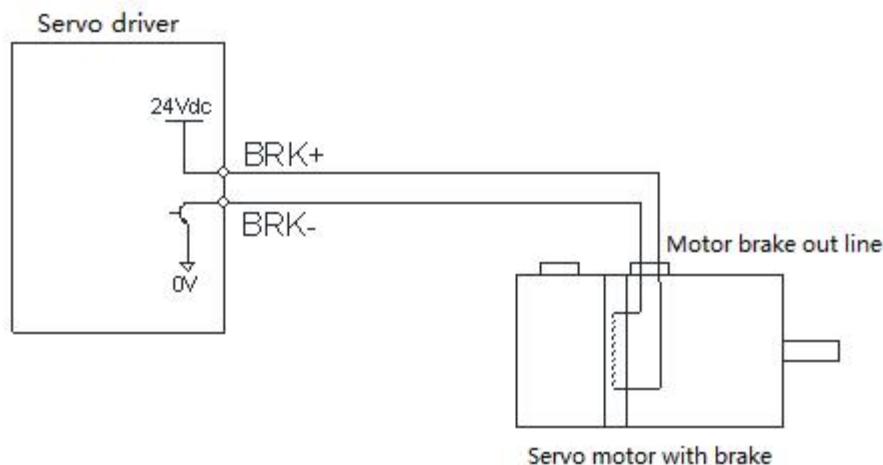
3.4 Servo driver communication signal terminal X1

DRV series pulse/RS485 driver、DRV series CAN driver：
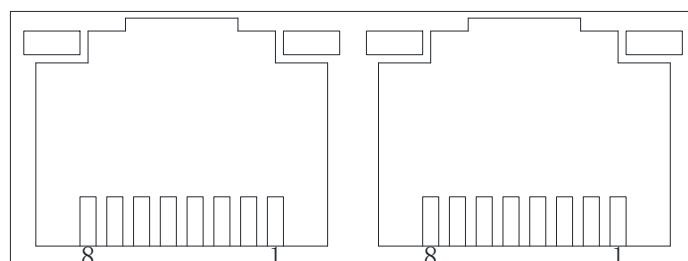
Signal name		Default function	Pin number
Communication	RS485+	1	RS485 communication port

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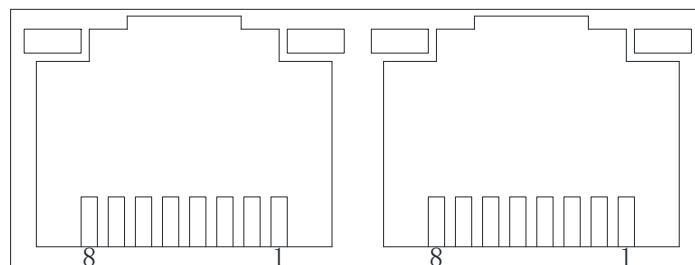
Pin	Definition	Description
1	TX+	Data send+
2	TX-	Data send-
3	RX+	Data receive+
4	NULL	Null
5	NULL	Null
6	RX-	Data receive-
7	NULL	Null
8	NULL	Null

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 Communication network configuration

4.1 CANopen protocol overview

CANopen is an application layer protocol of a network transmission system based on CAN serial bus, following the ISO/OSI standard model. Different devices in the network exchange data with each other through object dictionaries or objects. The master node can obtain or modify data in the object dictionary lists of other nodes through process data objects (PDO) or service data objects (SDO).

4.1.1 Object dictionary

The object dictionary is the most important part of the device specification. It is an ordered collection of a set of parameters and variables, including all parameters of device description and device network status. A set of objects that can be accessed in an orderly and predefined way through the network.

The CANOpen protocol uses an object dictionary with a 16-bit index and an 8-bit sub-index. The structure of the object dictionary is shown in the following table.

Index	Object
0000h	Unused
0001h～001Fh	Static data types (standard data types, such as Boolean, Integer16)
0020h～003Fh	Complex data types (predefined structures composed of simple types such as PDOCommPar, SDOParmeter)
0040h～005Fh	Complex data types specified by the manufacturer
0060h～007Fh	Static data type specified by the device sub-protocol
0080h～009Fh	Complex data types specified in the device sub-protocol
00A0h～0FFFh	Reserve
1000h～1FFFh	Communication sub-protocol area (such as device type, error register, number of supported PDOs)
2000h～5FFFh	Manufacturer-specific sub-protocol area (such as function code mapping)
6000h～9FFFh	Standard equipment sub-protocol area (such as DSP-402 protocol)
A000h～FFFFh	Reserve

4.1.2 Communication object

CANopen specifications that the DRV series CAN bus servo drivers follow:

● Follow CAN 2.0A standard

● Follow CANopen standard protocol DS 301 V4.02

● Follow CANopen standard protocol DSP 402 V2.01

CANopen communication services supported by DRV series CAN bus servo drivers:

● Network Management Object (NMT): NMT Slave service

● Device monitoring: heartbeat message

● Process Data Object (PDO): Up to 4 TxPDO and 4 RXPDO can be configured. PDO transmission type: support event trigger, event trigger, synchronous cycle, synchronous acyclic

- Service Data Object (SDO)
- Emergency message (EMCY)

4.1.3 Communication object identifier

The communication object identifier (COB-ID) specifies the priority of the object and the identification of the communication object in the communication process. The COB-ID corresponds to the 11-bit frame ID of CAN2.0A. The 11-bit COB-ID consists of two parts, a 4-bit object function code and a 7-bit node address, as follows:

10	9	8	7	6	5	4	3	2	1	0
Function code				Node ID						

Each CANopen communication object has a default COB-ID, which can be read through SDO, and some can be modified through SDO. Object list:

Communication object	Function code	Node address	COB-ID	Object dictionary index
NMT network management	0000b	0	0x000	-
Synchronization object	0001b	0	0x080	1005h/1006h
Urgent Message Object	0001b	1～127	80h + Node ID	1014h
TPDO1	0011b	1～127	180h + Node ID	1800h
RPDO1	0100b	1～127	200h + Node ID	1400h
TPDO2	0101b	1～127	280h + Node ID	1801h
RPDO2	0110b	1～127	300h + Node ID	1401h
TPDO3	0111b	1～127	380h + Node ID	1802h
RPDO3	1000b	1～127	400h + Node ID	1402h
TPDO4	1001b	1～127	480h + Node ID	1802h
RPDO4	1010b	1～127	500h + Node ID	1402h
T_SDO	1011b	1～127	580h + Node ID	1200h
R_SDO	1100b	1～127	600h + Node ID	1200h
Network management error control	1110b	1～127	700h + Node ID	1016h/1017h

For example:

The COB-ID of slave station No. 3 TPDO1 is 180h + 3 = 183h

4.2 Communication settings

In order to enable the DRV series CAN bus servo drive to accurately connect to the CANopen field bus network, it is necessary to set the relevant parameters of the DRV series servo driver.

Parameter	Name	Setting range	Factory setting

P01.00	Control mode selection	0 – Position Mode 1 - Speed mode 2 - Torque 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	3
P08.05	Servo axis address	1～127	2
P08.06	CAN communication rate selection	0 – 20K 1 – 50K 2 – 100K 3 – 125K 4 – 250K 5 – 500K 6 – 1M	4

4.3 **Network Management (NMT)**

The Network Management System (NMT) is responsible for initializing, starting and stopping the network and the devices in the network and is a master/slave system. there is one and only one NMT host in the CANopen network that can configure the CANopen network including itself.

4.3.1 NMT services

CANopen performs the corresponding work according to the state machine specified in the protocol. Part of it is automatically implemented internally by the driver and part of it must be implemented by the NMT host sending NMT messages.The NMT state machine is shown below.
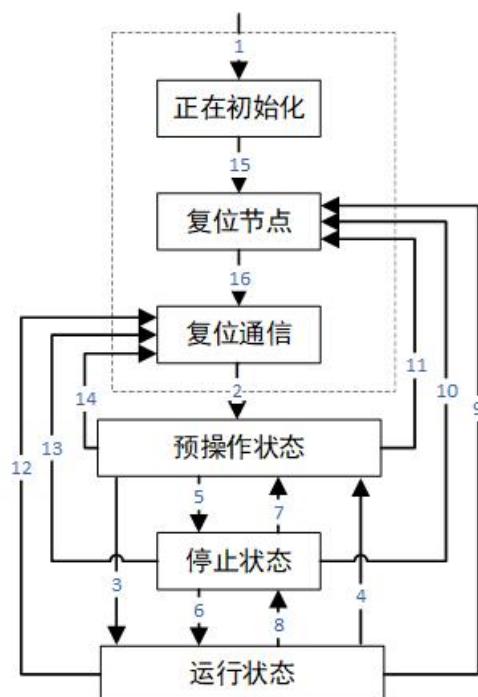
In the above figure, except for the transitions in (1), (15), and (16), all of them are implemented by NMT messages, and only the NMT host can send NMT control messages, and the message data format is shown as follows.

COB-ID	RTR	Data/byte	
		0	1
0x000	0	command word	Node ID

The COB-ID of the NMT message is fixed at "0x000"

The data area of an NMT message consists of two bytes.

- The first byte is the command word, indicating the control role of the communication frame
- The second byte is the CANopen node address, when it is 0 it is a broadcast message and is valid for all slave devices in the network

The NMT message command is as follows:

command word	instructions
0x01	Start remote node
0x02	Stop remote nodes
0x80	Entering preoperational status
0x81	Reset node
0x82	Reset communication

The device automatically enters an initialization state upon power-up, including being initialized, resetting the node, and resetting the communication. Ongoing initialization loads the parameters of each module. And the reset node restores the object dictionary manufacturer definition area and subprotocol area to the last saved value. Reset communication restores the communication parameters in the object dictionary to the last saved value.

At the end of initialization, the device will send a Boot-up message and automatically enter the pre-operation state, which is the primary configuration node state.

After completing the configuration, the node needs the NMT host to send an NMY message to enter the operational state. The operational state is the state when CANopen is working normally and each module should be working normally.

When the NMT host sends a stop node message, the device enters the stop state and only the NMT module works normally for CANopen communication.

The CANopen services supported in various NMT states are shown below:

services	preoperational	operations	stop
Process Data Objects (PDO)	deny	be	deny
Service Data Object (SDO)	be	be	deny
Synchronous objects (SYNC)	be	be	deny
Emergency Message (EMCY)	be	be	deny
Network Management	be	be	be

(NMT)			
error control	be	be	be

4.3.2 NMT error control

NMT error control is mainly used to detect if a device in the network is online and the state the device is in, including node protection, lifetime protection and heartbeat.

● Does not allow simultaneous use of node/lifetime protection and heartbeat

● The node/life protection and heartbeat should not be set too short to avoid increasing the network load

1） Heartbeat

The heartbeat mode uses the "producer-consumer" model, where the CANopen device sends heartbeat messages in ms according to the period set by the producer heartbeat interval object 0x1017. The node with the consumer heartbeat function in the network monitors this producer according to the consumer time set in object 0x1016 and considers the node to be faulty once the producer heartbeat of the corresponding node is not received within the consumer heartbeat time.

After configuring the producer heartbeat interval 0x1017, the node heartbeat function activates and starts generating heartbeat messages. After configuring a valid subindex of consumer heartbeat 0x1016, monitoring starts upon receiving a frame of heartbeat from the corresponding node.

The host sends a heartbeat telegram at its producer time. the slave monitoring the host does not receive the heartbeat telegram within 0x1016 subindex time. the host is considered offline. 0x1016 some subindex time ≥ producer time × 1.8. otherwise it is easy to falsely report that the host is offline.

The slave sends a heartbeat telegram every 0x1017 time. the host (or other slave) that monitors the slave. if the heartbeat telegram is not received within the consumer time. the slave is considered dropped. 0x1017 × 1.8 ≤ the consumer time of the host (or other slave) that monitors the slave. otherwise. it is easy to falsely report that the slave is dropped.

The number of heartbeat messages is shown below, the data segment is one byte long, the highest bit is fixed to "0" and the other bits indicate the status of the CANopen device:

COB-ID	RTR	Data
0x700 + Node ID	0	Bit7: 0 Bit6 to Bit0. 4 - Stop state 5 - Operational status 127 - Pre-operation status

2） Node/Life Protection

DRV series CAN bus servo does not support node/life protection mode at this time

4.4 Service Data Object (SDO)

The SDO is used to access the object dictionary of a device, the visitor is called a Client and the CANopen device to which the object dictionary is accessed and which provides the requested service is called a Server. A request from a client must have an answer from the server.

SDO transfers are divided into object data transfers of no more than 4 bytes and higher than 4 bytes. The accelerated SDO transfer method is used for not higher than 4 bytes, and the segmented transfer or block transfer method is used for higher than 4 bytes.

The SDO transmission message consists of a COB-ID and a data segment. the COB-IDs of the T_SDO (0x580+Node ID) and R_SDO (0x600+Node ID) messages do not match. The data segments are arranged in small-end mode, i.e., low bits first and high bits second. All SDO message data segments must be 8 bytes (although not all data bytes are necessarily meaningful). the SDO transmission message format is listed in the following table:

COB-ID	Data							
0x580+Node ID	0	1	2	3	4	5	7	8
0x600+Node ID	command code	index		subindex	data			

Among them, the command code indicates the transmission type and transmission data length of the segment of SDO, the index and sub-index are the position of the object in the list, and the data is the value of the object.

（1） SDO accelerated write transmission messages

For reads and writes of no more than 4 bytes, accelerated SDO transmission is adopted. According to the inconsistency of the reading and writing mode and the length of the content data, the transmission messages are different. The speed up SDO write message is as follows:

Equipment		COB-ID	Data							
			0	1	2	3	4	5	6	7
Client		0x600 + Node ID	0x23	index		subindex	data			
			0x27				data			-
			0x2B				data		-	
			0x2F				data		-	
Server	Normal	0x580 + Node ID	0x60	index		subindex	-			
	Abnormal		0x80				Termination Code			

Note: "-" means data are available but not considered, it is recommended to write 0

For examples:

The station number of the slave station is 4, the operating speed value 60FFh-00 in the speed mode is written with SDO, and the written value is 1000, that is, 0x3E8. The message sent by the master station is as follows (all data are in hexadecimal):

COB-ID	Data							
	0	1	2	3	4	5	6	7
604	23	FF	60	00	E8	03	00	00

If the write is normal, the servo drive will return the following message:

COB-ID	Data							
	0	1	2	3	4	5	6	7
584	60	FF	60	00	00	00	00	00

If the written data type does not match, the error code 0x06070010 will be returned, and the message will be as follows:

COB-ID	Data							
	0	1	2	3	4	5	6	7
584	80	FF	60	00	10	00	07	06

（2） SDO accelerated read transmission messages

When the SDO read operation is not higher than 4 bytes of object data, the acceleration mode is adopted, and the message is as follows:

Equipment		COB-ID	Data							
			0	1	2	3	4	5	6	7
Client		0x600 + Node ID	0x40	index		subindex	-			
Server	Normal	0x580 + Node ID	0x43	index		subindex	data			
			0x47				data			-
			0x4B						-	
			0x4F					-		
	Abnormal		0x80h				Termination Code			

For examples:

The station number of the slave station is 4, use SDO to read the parameter control mode P01.00, which is the object 0x2003-01, and the master station sends the message as follows (all data are in hexadecimal):

COB-ID	Data							
	0	1	2	3	4	5	6	7
604	40	03	20	01	00	00	00	00

The default control mode is 3, and the return message under normal circumstances is as follows:

COB-ID	Data							
	0	1	2	3	4	5	6	7
584	4B	03	20	01	03	00	00	00

If the written command word does not match, an invalid command word error will be returned, the error code is 0x05040001, and the message is as follows:

COB-ID	Data							
	0	1	2	3	4	5	6	7
584	80	03	20	01	01	00	04	05

4.5 **Process Data Objects (PDO)**

4.5.1 PDO transfer framework

Process Data Object (PDO) is used to transfer data in real time and is the main data transfer method in CANopen. PDO uses the producer/consumer mode, the PDO length can be less than 8 bytes and the transfer speed is fast.PDO data transfer can be tried in a one-to-one or one-to-many way.

4.5.2 PDO object

According to the difference between receiving and transmitting, PDO can be divided into RPDO and TPDO.PDO is determined by the communication parameters and mapping parameters together to determine the final transmission method and content.DRV servo driver uses 4 RPDO and 4 TPDO to implement the PDO transmission, the related objects are listed as follows.

Name		COB-ID	Communication object	Mapping object
RPDO	1	0x200 + Node ID	0x1400	0x1600
	2	0x300 + Node ID	0x1401	0x1601
	3	0x400 + Node ID	0x1402	0x1602
	4	0x500 + Node ID	0x1403	0x1603
TPDO	1	0x180 + Node ID	0x1800	0x1A00
	2	0x280 + Node ID	0x1801	0x1A01
	3	0x380 + Node ID	0x1802	0x1A02
	4	0x480 + Node ID	0x1803	0x1A03

4.5.3 PDO communication parameters

（1）　CAN identifier for PDO

The CAN identifier of the PDO is the COB-ID of the PDO, which contains control bits and identification data, and determines the bus priority of the PDO. On the sub-index 0x01 of the COB-ID bit and communication parameters (RPDO: 1400h～1403h, TPDO: 1800h～1803h), the highest bit determines whether the PDO is valid.

For examples:

For a node with a station number of 4, when TPDO3 is in an invalid state, its COB-ID should be 0x80000384, and writing 0x384 to the COB-ID indicates that the PDO is activated.

（2）　Types of PDO transmissions

The transmission type bit of the PDO and the sub-index 0x02 of the communication parameters (RPDO: 1400h～1403h, TPDO: 1800h～1803h) determine which transmission mode the PDO follows. The different values of the communication parameters represent different transmission types, and define the method of triggering TPDO transmission or processing the received RPDO. The specific corresponding relationship is as follows:

Communication type value	synchronize		synchronous
	cycle	acyclic	
0	-	√	-

1～240	√	-	-
241～53	reserve		
254～255	-	-	√

- When the transmission type of TPDO is 0, if the mapping data is changed and a synchronization frame is received, the change TPDO is sent
- When the transmission type of TPDO is 1 to 240, the TPDO is sent when the corresponding number of synchronous frames is received
- When the transmission type of TPDO is 254 or 255, the TPDO is sent if the mapping data changes or the event counter arrives
- When the transmission type of RPDO is 0～240, as long as a synchronization frame is received, the latest data of the RPDO will be updated to the application
- When the transmission type of RPDO is 254 or 255, the received data is directly updated to the application.

（3） Prohibition time

The prohibition time is set for TPDO, which is stored in the sub-index 0x03 of the communication parameter (0x1800～0x1803) to prevent the PDO with a lower priority in the CAN network from being continuously occupied. The unit of changing the parameter is 100us. After setting the value, the transmission interval of the same TPDO will not be less than the time corresponding to the changed parameter.

For example:

The prohibition time of TPDO2 is 300, then the transmission interval of TPDO will not be less than 30ms.

（4） Event timer

For the TPDO of asynchronous transmission (transmission type is 254 or 255), define the event timer, which is located on the sub-index 0x05 of the communication parameter (0x1800～0x1803). The event timer can also be regarded as a trigger event, which will also trigger the corresponding TPDO transmission. If other events such as data changes occur during the timer running period, TPDO will also be triggered, and the event counter will be reset immediately.

4.5.4 PDO mapping parameters

The PDO mapping parameter contains a pointer to the process data corresponding to the PDO that the PDO needs to send or receive, including the index, sub-index, and the length of the mapping object. The data length of each PDO can be up to 8 bytes, and one or more objects can be mapped at the same time. Among them, the sub-index 0 records the number of objects specifically mapped by the PDO, and the sub-indexes 1 to 8 are the mapping content. The contents of the mapping parameters are defined as follows.

Number of digits	31	……	16	15	……	8	7	……	0
meaning	index			subindex			Object Length		

The index and sub-index jointly determine the position of the object in the object dictionary. The length of the object indicates the specific bit length of the object, expressed in hexadecimal numbers, namely:

Object Length	Bit length

08h	8-bit
10h	16-bit
20h	32-bit

For example:

Indicates that the mapping parameter of the 16-bit command word 6040h-00 is 60400010h

4.6 **Synchronous objects (SYNC)**

A synchronization object (SYNC) is a special mechanism that controls the tuning and synchronization between multiple nodes transmitting and receiving for synchronous transmission of PDO.

4.6.1 Synchronization generator

DRV servo drivers are not only synchronous consumers, but also try synchronous producers. The objects that support synchronization are the synchronization object COB-ID (1005h) and the synchronization cycle period (1006h).

The second highest bit of the synchronization object COB-ID determines whether to activate the synchronization generator.

The synchronization cycle period is only for the synchronization generator, and the unit is us, indicating the interval when the node generates the synchronization object.

4.6.2 Synchronous Object Transfer Framework

Similar to the transmission of PDO, the transmission of synchronization objects follows a producer-consumer model, where a synchronization producer sends a synchronization frame and all other nodes in the CAN network can receive this synchronization frame as consumers and without feedback. Only one active synchronization generator is allowed in the same CAN network.

The transmission of synchronous PDO is closely linked to synchronous frames:

- For synchronous RPDO, as long as the PDO is received, the received PDO will be updated to the application at the next SYNC.
- For synchronous TPDO, it is divided into synchronous cycle and synchronous acyclic. The synchronization cycle is a PDO with a PDO transmission type of 1 to 240. As long as the SYNC specified by the transmission type is reached, the TPDO needs to be sent regardless of whether the data changes. Synchronous acyclic means that the PDO transmission type is 0, and the content of the PDO mapping object changes, and it is sent at the next SYNC.

For example:

The transmission type of RPDO1 is 0, the transmission type of RPDO2 is 5, the transmission type of TPDO1 is 0, and the transmission type of TPDO2 is 20. Then, as long as RPDO1 and RPDO2 receive PDO, they will update the latest PDO data to the corresponding application at the next SYNC; while the mapping data of TPDO1 only changes, it will send TPDO1 at the next SYNC, and when TPDO2 has experienced 20 SYNC in total. Regardless of whether the data is changed, PDO will be sent.

4.7 **Emergency Object Service (EMCY)**

When a CANopen node has an error, the node sends an emergency message frame according to the standardized mechanism. The emergency message follows the producer-consumer model, where other nodes in the CAN network can choose to handle the fault after the node fault is sent. the DRV servo drive only acts as an emergency message producer and does not handle other node emergency messages.

When a node fails, the error register and predefined error field need to be updated regardless of whether the emergency object is activated or not. The contents of the emergency message are as follows:

COB-ID	Data							
	0	1	2	3	4	5	6	7
0x80+Node ID	error code		error register	reserve	auxiliary byte			

The error register is always consistent with 1001h:

● When the communication is abnormal, the error code is consistent with the requirements of DS301, and the auxiliary byte is zero when the communication is abnormal.

● When the driver has an error described in the DSP402 sub-protocol, the error code is consistent with the DS402 requirement and corresponds to the object 603Fh, and the auxiliary byte is an additional description.

● When a user-specified exception occurs in the driver, the error code is 0xFF00, and the auxiliary byte displays the user-specified error code

Chapter 5 Operation

5.1 Basic settings

5.1.1 Conversion factor setting

Object 6091h is used to set the electronic gear ratio of the servo driver:

The essential meaning of gear ratio is: when the load shaft is displaced by one command unit, the corresponding motor displacement (unit: encoder unit). The gear ratio is composed of the numerator 6091-01h and the denominator 6091-02. Through the gear ratio, the proportional relationship between the displacement of the load shaft (command unit) and the displacement of the motor (encoder unit) can be established:

Motor displacement = load shaft displacement x gear ratio

The motor and the load are connected with other mechanical transmission mechanisms through a reducer. Therefore, the gear ratio is related to the mechanical reduction ratio, mechanical size-related parameters, and motor resolution. The calculation method is as follows:

$$\text{gear ratio} = \frac{\text{motor resolution}}{\text{load shaft resolution}}$$

Index 6091h	Name	Gear ratio				Data structure	ARR	Data type	Uint32
	Data range	OD data range	Factory setting	OD default	Accessibility	-	Related models	PP/PV/HM	Map	YES

The gear ratio is used to establish a user-specified proportional relationship between the load shaft displacement and the motor shaft displacement.

1）、motor feedback position (encoder unit) and load axis position feedback (command unit relationship):

$$\text{motor feedback position} = \text{load shaft feedback position} \times \text{gear ratio}$$

2）、Motor speed (rpm) versus load shaft speed (command unit/s):

$$\text{motor spees(rpm)} = \frac{\text{load shaft speed} \times \text{gear ratio}}{\text{encoder resolution}} \times 60$$

3）、Motor acceleration (rpm/ms) versus load speed (command unit/s ^{2}):

$$\text{motor acceleration} = \frac{\text{load shaft acceleration} \times \text{gear ratio}}{\text{encoder resolution}} \times \frac{1000}{60}$$

Subindex 00h	Name	Maximum subindex number of the gear ratio				Data structure	-	Data type	Uint8
	Data range	-	Factory setting	2	Accessibility	RO	Related models	-	Map	NO

Subindex 01h	Name	Gear ratio numerator				Data structure	VAR	Data type	Int32
	Data range	$1 \sim (2^{31}\text{-}1)$	Factory setting	1	Accessibility	RW	Related models	-	Map	RPDO

Subindex 02h	Name	Gear ratio denominator				Data structure	VAR	Data type	Int32
	Data range	$1 \sim (2^{31}\text{-}1)$	Factory setting	1	Accessibility	RW	Related models	-	Map	RPDO

● Take a ball screw as an example:

Minimum unit of command fc = 1mm

Lead screw PB = 10mm/r

Deceleration ratio n = 5:1

ncoder resolution for motor model RSMA-M08J2430A is P = 131072 (p/r)

Therefore, the location factor is calculated as follows:

$$location\ factor = \frac{P \times n}{PB} = \frac{131072 \times 5}{10} = \frac{65536}{1}$$

Therefore:

6091-01h = 65536

6091-02h = 1

Its essential meaning is: when the load displacement is 1mm, the motor displacement is 65536 strokes (encoder unit)

5.2 **Servo status setting**

The servo driver must be guided in accordance with the process specified in the standard CiA402 protocol for the Servo Drive to operate in the specified state.
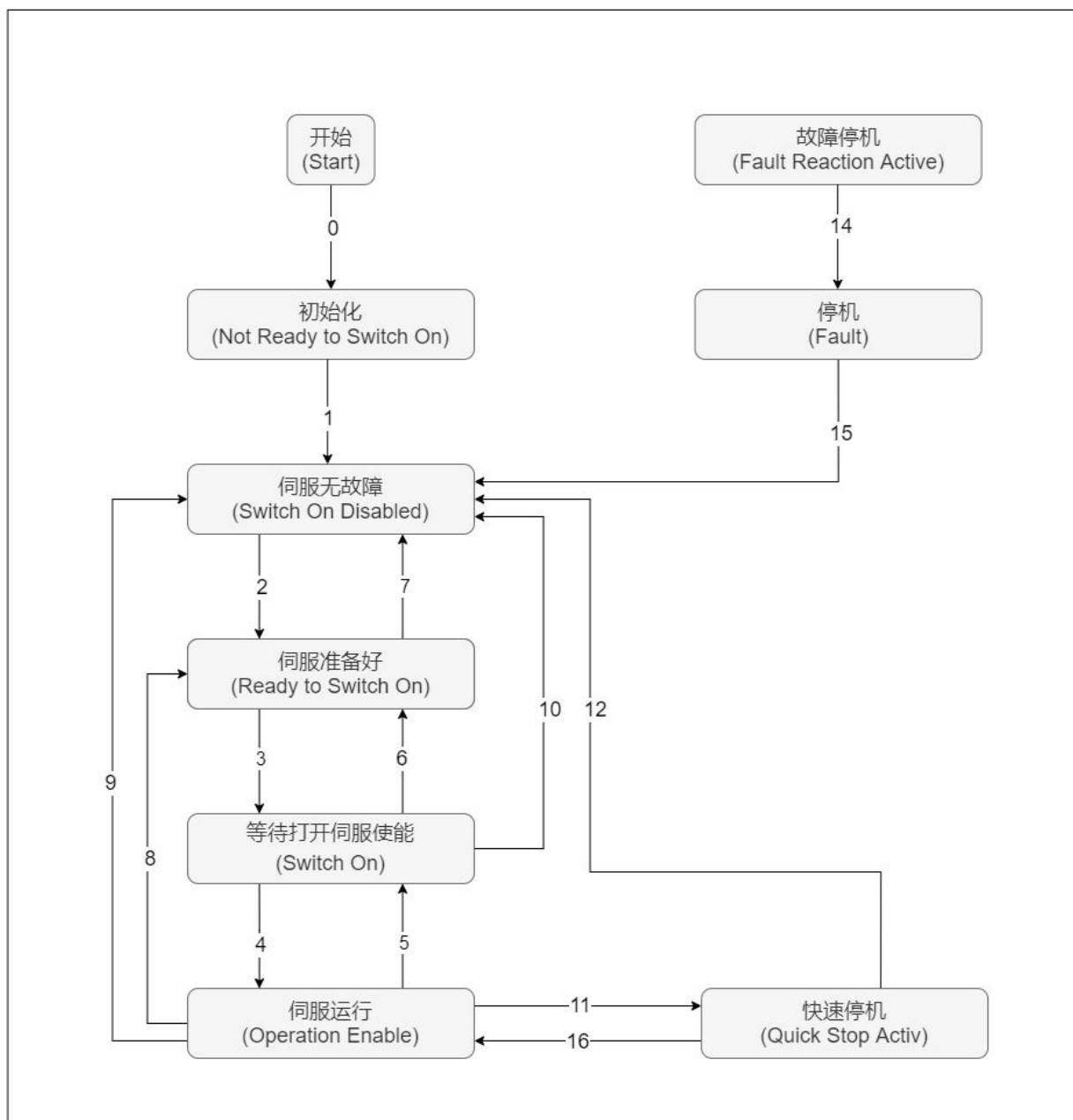
Initialization	Driver initialization and internal self-check have been completed
	The parameters of the driver cannot be set, nor can the driver function be executed

Servo without failure	The servo driver has no fault or the error has been eliminated Driver parameters can be set
Servo ready	Servo driver is ready Driver parameters can be set
Waiting to turn on servo enable	The servo driver is waiting to turn on the servo enable Driver parameters can be set
Servo operation	The driver is operating normally, a certain servo operation mode has been enabled, the motor has been energized, and when the command is not 0, the motor will rotate The drive parameter attribute can be set as "operational change", otherwise it cannot be set.
Quick stop	The quick stop function is activated, and the driver is executing the quick stop function The driver parameter attribute can be set as "operational change", otherwise it cannot be set
Fault shutdown	The driver has failed and is in the process of shutdown. The driver parameter attribute can be set as "operational change", otherwise it cannot be set
Faults	When the fault stop is completed, all driver functions are prohibited, and the driver parameters are allowed to be changed in order to eliminate the fault.

Control commands and status switching:

	CiA402 state switching	Control word 6040h	Bit0 to Bit9 of status word 6041h
0	Power on → Initialization	Natural transition, no control commands required	0x0000
1	Initialization → No servo failure	Natural transition, no control commands required	0x0250
2	Servo is fault-free → Servo is ready	0x0006	0x0231
3	Servo ready → Wait to turn on servo enable	0x0007	0x0233
4	Wait to turn on servo enable → Servo operation	0x000F	0x0237
5	Servo operation → Wait to turn on servo enable	0x007	0x0233
6	Wait to turn on servo enable → Servo ready	0x006	0x0231
7	Servo ready → No servo failure	0x0000	0x0250
8	Servo running → Servo ready	0x0006	0x0231
9	Servo operation → No servo failure	0x0000	0x0250
10	Wait to turn on servo enable → No servo failure	0x0000	0x0250
11	Servo operation → Quick stop	0x0002	0x217
12	Quick stop → servo-free	Natural transition after shutdown is complete, no control commands required	0x0250
13	→ Failure to stop	If the servo driver fails in any state other than "fault", it will automatically switch to the fault stop state without command control.	0x021F
14	Failure to stop → Failure	Natural transition after the fault stop is done, no control commands required	0x0218
15	Fault → Servo without fault	0x80	0x0250
16	Quick stop → servo operation	When the shutdown is complete, send 0x0F	0x0237

5.2.1 Control word 6040h

Index 6040h	Name	control word					Data structure	VAR	Data type	Uint16
	Data range	0～65535	Factory setting	0	Accessibility	RW	Related models	ALL	Map	RPDO

Set control commands:

Bit	Name		description
0	可以开启伺服运行	Switch on	0: invalid, 1: valid
1	接通主回路电	Enable voltage	0: invalid, 1: valid
2	快速停机	Quick stop	0: invalid, 1: valid
3	伺服运行	Enable operation	0: invalid, 1: valid
4～6	运行模式相关	Operation mode specific	Related to servo operation mode
7	故障复位	Fault reset	For resettable faults and warnings, perform fault reset function The rising edge of Bit7 is valid; Bit7 remains at 1, other control commands are invalid
8	暂停	Halt	Please consult the object dictionary 605Dh for the pause method in each mode
9	运行模式相关	Operation mode specific	Related to each servo operation mode
10	保留	Reverse	undefined
11～15	厂家自定义	Manufacturer-specific	Manufacturer customization

◆ Note：
1)、Each Bit of the control word is meaningless when assigned individually, and must be used with other bits that do not form part of a control command；
2)、Bit0 to Bit3 and Bit7 have the same meaning in each servo mode, and commands must be sent in sequence to direct the servo driver into the expected state according to the CiA402 state machine switching process, with each command corresponding to a defined state.；
3)、Bit4 to Bit6 are related to each servo mode, please check the control commands in different modes；
4)、Bit9 undefined function

5.2.2 Status word 6041h

Index 6041h	Name	status word					Data structure	VAR	Data type	Uint16
	Data range	0～65535	Factory setting	0	Accessibility	RO	Related models	ALL	Map	TPDO

Reflect the current running status of the servo driver：

Bit	Name		description
0	伺服准备好	Ready to switch on	0: invalid, 1: valid
1	可以开启伺服运行	Switch on	0: invalid, 1: valid
2	伺服运行	Operation enabled	0: invalid, 1: valid
3	故障	Fault	0: invalid, 1: valid
4	主电路电接通	Voltage enabled	0: invalid, 1: valid
5	快速停机	Quick stop	0: invalid, 1: valid
6	伺服不可运行	Switch on disabled	0: invalid, 1: valid
7	警告	Warning	0: invalid, 1: valid
8	厂家自定义	Manufacturer specific	undefined
9	远程控制	Remote	0: invalid, 1: valid (control word in effect)
10	目标到达	Target reach	0: invalid, 1: valid
11	内部限制有效	Internal limit active	0: invalid, 1: valid
12～13	运行模式相关	Operation limit active	Related to each servo operation mode
14	厂家自定义	Manufacturer specific	undefined
15	原点已找到	Home find	0: invalid, 1: valid

Displayed value (binary value)	description
xxxx xxxx x0xx 0000	未准备好（Not ready to switch on）
xxxx xxxx x1xx 0000	启动失效（Switch on disabled）
xxxx xxxx x01x 0001	准备好（Ready to switch on）
xxxx xxxx x01x 0011	启动（Switch on）
xxxx xxxx x01x 0111	操作使能（Operation enabled）
xxxx xxxx x00x 0111	快速停机有效（Quick stop active）
xxxx xxxx x0xx 1111	故障反应有效（Fault reaction active）
xxxx xxxx x0xx 1000	故障（Fault）

◆ Note：

1）、Bit0 to Bit9 have the same meaning in each servo mode. After the control word 6040h sends the command in sequence, the servo feeds back a determined state.

2）、Bit12 to Bit13 are related to each servo mode (please check the control commands in different modes)

3）、Bit10, Bit11, Bit15 have the same meaning in each servo mode, feedback the state of the servo after executing a certain servo mode.

5.3 **Servo mode setting**

5.3.1 Introduction to servo mode

Index 60FFh	Name	Supports servo operation mode				Data structure	VAR	Data type	Uint32
	Data range	-	Factory setting	941	Accessibility	RO	Related models	-	Map	NO

Reflect the servo operation mode supported by the drive:

Bit	description	Support or not (0: not support, 1: support)
0	Profile Position Mode（PP）	1
1	Variable frequency speed control mode（VL）	0
2	Profile Velocity Mode（PV）	1
3	Profile Torque Mode（PT）	1
4	NA	0
5	Homing mode（HM）	1
6	Interpolated Position（IP）	0
7	Cyclic Synchronous Position Mode（CSP）	1
8	Cyclic Synchronous Velocity mode（CSV）	1
9	Cyclic Synchronous Torque Mode（CST）	1
10～31	NA	0

Index 6060h	Name	Mode selection				Data structure	VAR	Data type	Int16
	Data range	0～10	Factory setting	8	Accessibility	RW	Related models	ALL	Map	RPDO

Select the servo operation mode:

Set value	Servo mode
0/2/5	NA
1	Profile Position Mode（PP）
3	Profile Velocity Mode（PV）
4	Profile Torque Mode（PT）
6	Homing mode（HM）
7	Interpolated Position（IP）
8	Cyclic Synchronous Position Mode（CSP）
9	Cyclic Synchronous Velocity mode（CSV）
10	Cyclic Synchronous Torque Mode（CST）

Index 6061h	Name	Operation mode display					Data structure	VAR	Data type	Int16
	Data range	0～10	Factory setting	8	Accessibility	RO	Related models	ALL	Map	TPDO

Select the current operating mode of the servo driver：

Set value	Servo mode
0/2/5	NA
1	Profile Position Mode（PP）
3	Profile Velocity Mode（PV）
4	Profile Torque Mode（PT）
6	Homing mode（HM）
7	Interpolated Position（IP）
8	Cyclic Synchronous Position Mode（CSP）
9	Cyclic Synchronous Velocity mode（CSV）
10	Cyclic Synchronous Torque Mode（CST）

5.3.2 Mode Switching

Precautions for the use of servo operation status switching:

1） When the servo drive is in any state, after switching from the profile position mode or the cyclic synchronous position mode to other modes, the unexecuted position commands will be discarded.

2） When switching from other modes to running in cyclic synchronization mode, please send the command at least 5ms apart, otherwise command loss or error will occur.

5.4 Cyclic Synchronous Position Mode (CSP)

In the cyclic synchronous position mode, the host computer performs position command planning, and then sends the planned target position 607Ah to the servo drive in a cyclic synchronous manner, and the position, speed and torque control is done internally by the servo drive.

5.4.1 Related objects

Control word 6040h		
Bit	Name	Description
0	伺服准备好(Switch On)	When the value of Bit0 to Bit3 is 1, the motor is enabled
1	接通主回路电(Enable Voltage)	
2	快速停机(Quick Stop)	
3	伺服运行(Enable Operation)	
7	复位故障(Reset Fault)	0: no effect 1: Reset drive failure

Status word 6041h		
Bit	Name	Description
10	目标到达 Target Reached	0: target position not reached 1: target position reached
11	软件内部位置超限 Internal Limit Active	0: Neither the position command nor the position feedback exceeds the limit 1: Position command or position feedback overrun

12	从站跟随指令 Driver Follow the Command	0: Slave not following command
		1: Slave follow command
13	跟随错误 Following Error	0: No excessive position deviation fault
		1: Excessive position deviation fault occurs
15	原点回零完成 Home Find	0: Home not completed
		1: Home completed

Index (Hex)	Subindex (Hex)	Name	Data type	Setting range	Accessibility	Default value
603F	00	error code	Uint16	-	RO	0
6040	00	control word	Uint16	0～65535	RW	0
6041	00	status word	Uint16	-	RO	0
6060	00	operating mode	Int16	0～10	RW	8
6061	00	mode display	Int16	-	RO	8
6062	00	position command (unit: command unit)	Int32	-	RO	-
6063	00	position feedback (unit: encoder unit)	Int32	-	RO	-
6064	00	position feedback (unit: command unit)	Int32	-	RO	-
6065	00	position deviation excess Threshold (unit: command unit)	Uint32	$0～2^{32}-1$	RW	393216
6067	00	position reach threshold (unit: encoder unit)	Uint32	0～65535	RW	92
6068	00	position arrival time window (unit: ms)	Uint16	0～65535	RW	10
606C	00	actual speed (unit: command unit/s)	Int32	-	RO	-
6072	00	maximum torque (unit: 0.1%)	Uint16	0～3000	RW	3000
6077	00	actual torque (unit: 0.1%)	Int16	-5000～5000	RO	-
607A	00	target position (unit: command unit)	Int32	$-2^{31}～2^{31}-1$	RW	0
6091	01	gear ratio numerator	Uint32	$1～2^{32}-1$	RW	1
	02	gear ratio denominator	Uint32	$1～2^{32}-1$	RW	1
60F4	00	position deviation (unit: command units)	Int32	-	RO	-
60FC	00	position command (unit: encoder unit)	Int32	-	RO	-
2009	01	speed loop gain	Uint16	0～50000	RW	4000
	02	speed loop integration time	Uint16	1～30000	RW	1500
	03	position loop gain	Uint16	0～50000	RW	800
	0F	torque loop gain	Uint16	0～50000	RW	800
	10	torque loop integration time	Uint16	1～10000	RW	500

5.4.2 Related function settings

1）Positioning completion signal

Index (Hex)	Subindex (Hex)	Name	Description
2006	07	Position arrival threshold unit selection	Set the unit for 6067h. 0: command unit 1: encoder unit
6067	00	Position reaches threshold	If the absolute value of position deviation is within 6067h and the time reaches 6068h, the DO signal of position completion is valid and 6041h. Bit10 is set to 1. If either of these conditions is not met, the position arrival is invalid.
6068	00	Position arrival time window	

2）Position deviation excess threshold

Index (Hex)	Subindex (Hex)	Name	Description
6065	00	Position deviation excess threshold	When the absolute value of the position deviation is greater than the set value, an excessive position deviation fault occurs, the drive LED panel will display AL.240, and the status word 6041h4.Bit13 will be set to 1. When the set value is 0xFFFFFFFF, the drive will not detect excessive position deviation

5.4.3 Recommended configuration

RPDO	TPDO		Description
6040h：控制字(Control Word)	6041h：状态字(Status Word)		necessary
607Ah：目标位置(Target Position)	6064h：位置反馈(Position Actual Value)		necessary
6060h：模式选择(Modes of Operation)	6061h：运行模式(Modes of Operation Display)		optional
	603Fh：错误代码(Error Code)		optional
	60FDh：数字输入(Digital Inputs)		optional

5.5 **Cyclic Synchronous Velocity mode (CSV)**

In the cyclic synchronous velocity mode, the host computer sends the planned target speed of 60FFh to the servo drive in a cyclic synchronous manner, and the speed and torque control is done internally by the servo drive.

5.5.1 Related objects

Control word 6040h		
Bit	Name	Description
0	伺服准备好(Switch On)	When the value of Bit0 to Bit3 is 1, the motor is enabled
1	接通主回路电(Enable Voltage)	
2	快速停机(Quick Stop)	
3	伺服运行(Enable Operation)	
7	复位故障(Reset Fault)	0: no effect 1: Reset drive failure

Status word 6041h		
Bit	Name	Description
10	目标到达 Target Reached	0: Target speed not reached 1: Target speed reached
11	软件内部位置超限 Internal Limit Active	0: Neither the position command nor the position feedback exceeds the limit 1: Position command or position feedback overrun
12	从站跟随指令 Driver Follow the Command	0: Slave not following command 1: Slave follow command
15	原点回零完成 Home Find	0: Home not completed 1: Home completed

Index (Hex)	Subindex (Hex)	Name	Data type	Setting range	Accessibility	Default value
6040	00	control word	Uint16	0～65535	RW	0
6041	00	status word	Uint16	-	RO	0
6060	00	operating mode	Int16	0～10	RW	8
6061	00	mode display	Int16	-	RO	8
6063	00	position feedback (unit: encoder unit)	Int32	-	RO	-
6064	00	position feedback (unit: command unit)	Int32	-	RO	-
606C	00	actual speed (unit: command unit/s)	Int32	-	RO	-
6072	00	maximum torque (unit: 0.1%)	Uint16	0～3000	RW	3000
6077	00	actual torque (unit: 0.1%)	Int16	-5000～5000	RO	-
6091	01	gear ratio numerator	Uint32	$1\sim2^{31}-1$	RW	1
	02	gear ratio denominator	Uint32	$1\sim2^{31}-1$	RW	1
60FF	00	target speed (unit: command unit/s)	Int32	$-2^{31}\sim2^{31}-1$	RW	0

	01	speed loop gain	Uint16	0～50000	RW	4000
2009	02	speed loop integration time	Uint16	1～30000	RW	1500
	0F	torque loop gain	Uint16	0～50000	RW	800
	10	torque loop integration time	Uint16	1～10000	RW	500

5.5.2 Related function settings

1）Speed reach output function

Index (Hex)	Subindex (Hex)	Name	Description
606D	00	Speed reaching threshold	When the absolute value of the difference between the target speed 60FF (converted into the motor speed in rpm unit) and the actual motor speed is within 606Dh, and the time set by 606Eh is maintained, the status word 6041h.bit10 is set to 1, and the speed reaches the DO function is valid
606E	00	Speed arrival time window	

5.5.3 Recommended configuration

RPDO	TPDO	Description
6040h：控制字(Control Word)	6041h：状态字(Status Word)	necessary
6060h：模式选择(Modes of Operation)	6061h：运行模式(Modes of Operation Display)	optional
60FFh：目标速度(Target Velocity)		necessary
	6064h：位置反馈(Position Actual Value)	optional
	606Ch：速度反馈(Velocity Actual Value)	optional
	603Fh：错误代码(Error Code)	optional
	60FDh：数字输入(Digital Inputs)	optional

5.6 Cyclic Synchronous Torque Mode（CST）

In this mode, the host computer sends the calculated target torque 6071h to the servo drive periodically and synchronously, and the torque adjustment is executed internally by the servo drive. When the motor speed reaches the limit value, it will enter the speed regulation stage.

5.6.1 Related objects

Control word 6040h		
Bit	Name	Description
0	伺服准备好(Switch On)	When the value of Bit0 to Bit3 is 1, the motor is enabled
1	接通主回路电(Enable Voltage)	
2	快速停机(Quick Stop)	
3	伺服运行(Enable Operation)	
7	复位故障(Reset Fault)	0: no effect 1: Reset drive failure

Status word 6041h		
Bit	Name	Description
10	目标到达 Target Reached	0: Target torque not reached 1: Target torque reached
11	软件内部位置超限 Internal Limit Active	0: Neither the position command nor the position feedback exceeds the limit 1: Position command or position feedback overrun
12	从站跟随指令 Driver Follow the Command	0: Slave not following command 1: Slave follow command
15	原点回零完成 Home Find	0: Home not completed 1: Home completed

Index (Hex)	Subindex (Hex)	Name	Data type	Setting range	Accessibility	Default value
6040	00	control word	Uint16	0～65535	RW	0
6041	00	status word	Uint16	-	RO	0
6060	00	operating mode	Int16	0～10	RW	8
6061	00	mode display	Int16	-	RO	8
6063	00	position feedback (unit: encoder unit)	Int32	-	RO	-
6064	00	position feedback (unit: command unit)	Int32	-	RO	-
606C	00	actual speed (unit: command unit/s)	Int32	-	RO	-
6071	00	target torque (unit: 0.1%)	Int16	-3000～3000	RW	0
6072	00	maximum torque (unit: 0.1%)	Uint16	0～3000	RW	3000
6074	00	torque command (unit: 0.1%)	Int16	-5000～5000-	RO	-
6077	00	actual torque (unit: 0.1%)	Int16	-5000～5000	RO	-
2009	01	speed loop gain	Uint16	0～50000	RW	4000
	02	speed loop integration time	Uint16	1～30000	RW	1500
	0F	torque loop gain	Uint16	0～50000	RW	800
	10	torque loop integration time	Uint16	1～10000	RW	500

5.6.2 Related function settings

1） Torque reach output setting

Index (Hex)	Subindex (Hex)	Name	Description
2008	0A	Torque reaches reference value	Torque reaches reference value: A Torque reaches effective value: B Torque reaches invalid value: C ● When: |torque actual value|> |A + B|, the torque reaches DO is valid, and the status word 6041h.bit10 is set to 1. ● When: |torque actual value| <|A + C|, the torque reaches DO is invalid, and the status word 6041h.bit10 is cleared
2008	0B	Torque reaches effective value	
2008	0C	Torque reaches invalid value	

5.6.3 Recommended configuration

RPDO	TPDO	Description
6040h：控制字(Control Word)	6041h：状态字(Status Word)	necessary
6060h：模式选择(Modes of Operation)	6061h：运行模式(Modes of Operation Display)	optional
6071h：目标转矩(Target Torque)		necessary
	6064h：位置反馈(Position Actual Value)	optional
	606Ch：速度反馈(Velocity Actual Value)	optional
	6077h：转矩反馈(Torque Actual Value)	optional
	603Fh：错误代码(Error Code)	optional
	60FDh：数字输入(Digital Inputs)	optional

5.7 Profile Position Mode (PP)

Profile position mode is mainly used for point-to-point positioning applications. In this mode, the upper computer gives the target position (absolute or relative), velocity, acceleration and deceleration of the position curve, and the trajectory generator inside the servo will generate the target position curve command according to the settings, and the drive completes the position, velocity and torque control internally.

5.7.1 Related objects

Control word 6040h		
Bit	Name	Description
0	伺服准备好(Switch On)	When the value of Bit0 to Bit3 is 1, the motor is enabled
1	接通主回路电(Enable Voltage)	
2	快速停机(Quick Stop)	
3	伺服运行(Enable Operation)	
4	新目标位置(New Set-Point)	This is the rising edge from 0 to 1 indicates the pre-triggered new target position 607Ah, profile velocity 6081h, acceleration 6083h, deceleration 6084h given
5	立即更新(Change Set Immediately)	0: Not immediately updated 1: Update immediately
6	绝对位置/相位位置(Absolute/Relative)	0: The target position is an absolute position command 1: The target position is a relative position command
7	复位故障(Reset Fault)	0: no effect 1: Reset drive failure
8	暂停 Halt	0: Servo is set according to Bit0～Bit3 1: Servo pauses according to 605Dh setting

Status word 6041h		
Bit	Name	Description
10	目标到达 Target Reached	0: target position not reached 1: target position reached
11	软件内部位置超限	0: Neither the position command nor the position feedback exceeds the

	Internal Limit Active	limit
		1: Position command or position feedback overrun
12	目标位置更新 Set-Point Acknowledge	0: Slave not following command
		1: Slave follow command
13	跟随错误 Following Error	0: No excessive position deviation fault
		1: Excessive position deviation fault occurs
15	原点回零完成 Home Find	0: Home not completed
		1: Home completed

Index (Hex)	Subindex (Hex)	Name	Data type	Setting range	Accessibility	Default value
6040	00	control word	Uint16	0～65535	RW	0
6041	00	status word	Uint16	-	RO	0
6060	00	operating mode	Int16	0～10	RW	8
6061	00	mode display	Int16	-	RO	8
6062	00	position command (unit: command unit)	Int32	-	RO	-
6063	00	position feedback (unit: encoder unit)	Int32	-	RO	-
6064	00	position feedback (unit: command unit)	Int32	-	RO	-
6065	00	position deviation excess Threshold (unit: command unit)	Uint32	$0～2^{32}-1$	RW	393216
6067	00	position reach threshold (unit: encoder unit)	Uint32	0～65535	RW	92
6068	00	position arrival time window (unit: ms)	Uint16	0～65535	RW	10
606C	00	actual speed (unit: command unit/s)	Int32	-	RO	-
6072	00	maximum torque (unit: 0.1%)	Uint16	0～3000	RW	3000
6077	00	actual torque (unit: 0.1%)	Int16	-5000～5000	RO	-
607A	00	target position (unit: command unit)	Int32	$-2^{31}～2^{31}-1$	RW	0
6081	00	profile speed (unit: command pulse/s)	Uint32	$0～2^{32}-1$		10000
6083	00	profile acceleration (unit: command pulse/s ^{2})	Uint32	$0～2^{32}-1$		10000
6084	00	profile deceleration (unit: command pulse/s ^{2})	Uint32	$0～2^{32}-1$		10000
6091	01	gear ratio numerator	Uint32	$1～2^{31}-1$	RW	1
	02	gear ratio denominator	Uint32	$1～2^{31}-1$	RW	1
60F4	00	position deviation (unit: command units)	Int32	-	RO	-
60FC	00	position command (unit: encoder unit)	Int32	-	RO	-
2009	01	speed loop gain	Uint16	0～50000	RW	4000
	02	speed loop integration time	Uint16	1～30000	RW	1500
	03	position loop gain	Uint16	0～50000	RW	800

| | 0F | torque loop gain | Uint16 | 0～50000 | RW | 800 |
| | 10 | torque loop integration time | Uint16 | 1～10000 | RW | 500 |

5.7.2 Related function settings

1）Positioning completion signal

Index (Hex)	Subindex (Hex)	Name	Description
2006	07	Position arrival threshold unit selection	Set the unit for 6067h. 0: command unit 1: encoder unit
6067	00	Position reaches threshold	If the absolute value of position deviation is within 6067h and the time reaches 6068h, the DO signal of position completion is valid and 6041h. Bit10 is set to 1. If either of these conditions is not met, the position arrival is invalid.
6068	00	Position arrival time window	

2）Position deviation excess threshold

Index (Hex)	Subindex (Hex)	Name	Description
6065	00	Position deviation excess threshold	When the absolute value of the position deviation is greater than the set value, an excessive position deviation fault occurs, the drive LED panel will display AL.240, and the status word 6041h4.Bit13 will be set to 1. When the set value is 0xFFFFFFFF, the drive will not detect excessive position deviation

5.7.3 Position curve generator

1）Update immediately

a）The upper computer first updates and modifies other attributes of the displacement command as needed (acceleration time 6083h, deceleration time 6084h, contour speed 6081h, target displacement 607Ah)

b）The host computer sets the bit4 of 6040h from 0 to 1, indicating that the slave station has a new displacement command that needs to be enabled

c）After receiving the rising edge of bit 4 of 6040h, the slave station judges whether the new displacement command can be received:

If the initial state of bit 5 of 6040 is 0, and bit 12 of 6041h is 0 at this time, it indicates that the slave station can receive a new displacement command①; after receiving the new displacement command, the slave station sets bit 12 of 6041 from 0 to 1, indicating the new displacement command ① has been received, and the current slave station is in a state where it cannot continue to receive new displacement commands.

In immediate update mode, once a new displacement command is received (biyt12 of 6041h changes from 0 to 1), the servo will immediately execute the displacement command.

d）After the upper computer receives the bit12 of the status word 6041h of the slave station becomes 1, it can release the displacement command data, and set the bit4 of the control word 6040h from 1 to 0, indicating that there is no new position command at present.

Because bit4 of 6040h is valid for edge change, this operation will not interrupt the displacement command being executed.

e）When the slave station detects that the bit4 of the control word 6040h changes from 1 to 0, it can set the bit12 of the status word 6041h from 1 to 0, indicating that the slave station is ready to receive a new displacement command.

In immediate update mode, when the slave detects that bit 4 of the control word 6040h changes from 1 to 0, it will always clear bit 12 of 6041h.

In immediate update mode, during the execution of the current displacement command ①, a new displacement command ② is received, and the unexecuted displacement command in ① is not discarded. For the relative position command, after the positioning of the second displacement command is completed, the total displacement increment = target position increment 607Ah of ①+ target position increment 607Ah of ②, for the absolute position command, after the second stage of displacement command positioning is completed, the user's absolute position = target position 607Ah of ②.

2）Non-immediate update

a）The upper computer first updates and modifies other attributes of the displacement command as needed (acceleration time 6083h, deceleration time 6084h, contour speed 6081h, target displacement 607Ah)

b）The host computer sets the bit4 of 6040h from 0 to 1, indicating that the slave station has a new displacement instruction that needs to be enabled

c）After receiving the rising edge of bit 4 of 6040h, the slave station judges whether the new displacement command can be received:

If the initial state of bit 5 of 6040 is 0, and bit 12 of 6041h is 0 at this time, it indicates that the slave station can receive a new displacement command①; after receiving the new displacement command, the slave station sets bit 12 of 6041 from 0 to 1, indicating the new displacement command ① has been received, and the current slave station is in a state where it cannot continue to receive new displacement commands.

d）After the upper computer receives the bit12 of the status word 6041h of the slave station becomes 1, it can release the displacement command data, and set the bit4 of the control word 6040h from 1 to 0, indicating that there is no new position command at present.。

Because bit4 of 6040h is valid for edge change, this operation will not interrupt the displacement command being executed.

e）The slave station detects that the bit 4 of the control word 6040 changes from 1 to 0, and releases the bit 12 of 6041 after the current segment positioning is completed, indicating that the slave station is ready to receive a new displacement command. In non-immediate update mode, while the current segment is running, the servo cannot receive a new displacement command. After the current segment positioning is completed, the servo can receive a new displacement command. Once received (bit12 of 6041 changes from 0 to 1), the servo executes the displacement command immediately.

5.7.4 Recommended configuration

RPDO	TPDO	Description
6040h：控制字(Control Word)	6041h：状态字(Status Word)	necessary
607Ah：目标位置(Target Position)	6064h：位置反馈(Position Actual Value)	necessary
6060h：模式选择(Modes of Operation)	6061h：运行模式(Modes of Operation Display)	optional
6081h：轮廓速度(Profile Velocity)		necessary
6083h：轮廓加速度(Profile Acceleration)		optional
6084h：轮廓减速度(Profile Deceleration)		optional

5.8 Profile Velocity Mode (PV)

In this mode, the host computer sends the target speed, acceleration, and deceleration to the servo driver, and the speed and torque adjustment is performed internally by the servo.

5.8.1 Related objects

Control word 6040h			
Bit	Name	Description	
0	伺服准备好(Switch On)	When the value of Bit0 to Bit3 is 1, the motor is enabled	
1	接通主回路电(Enable Voltage)		
2	快速停机(Quick Stop)		
3	伺服运行(Enable Operation)		
4	新目标位置(New Set-Point)	This is the rising edge from 0 to 1 indicates the pre-triggered new target position 607Ah, profile velocity 6081h, acceleration 6083h, deceleration 6084h given	
5	立即更新(Change Set Immediately)	0: Not immediately updated 1: Update immediately	
6	绝对位置/相位位置(Absolute/Relative)	0: The target position is an absolute position command 1: The target position is a relative position command	
7	复位故障(Reset Fault)	0: no effect 1: Reset drive failure	
8	暂停 Halt	0: Servo is set according to Bit0～Bit3 1: Servo pauses according to 605Dh setting	

Status word 6041h		
Bit	Name	Description
10	目标到达 Target Reached	0: Target speed not reached 1: Target speed reached
11	软件内部位置超限 Internal Limit Active	0: Neither the position command nor the position feedback exceeds the limit 1: Position command or position feedback overrun
15	原点回零完成 Home Find	0: Home not completed 1: Home completed

Index (Hex)	Subindex (Hex)	Name	Data type	Setting range	Accessibility	Default value
6040	00	control word	Uint16	0~65535	RW	0
6041	00	status word	Uint16	-	RO	0
6060	00	operating mode	Int16	0~10	RW	8
6061	00	mode display	Int16	-	RO	8
6063	00	position feedback (unit: encoder unit)	Int32	-	RO	-
6064	00	position feedback (unit: command unit)	Int32	-	RO	-
606C	00	actual speed (unit: command unit/s)	Int32	-	RO	-
6072	00	maximum torque (unit: 0.1%)	Uint16	0~3000	RW	3000
6077	00	actual torque (unit: 0.1%)	Int16	-5000~5000	RO	-
60FF	00	profile speed (unit: command pulse/s)	Uint32	$0\sim2^{32}-1$	RW	0
6091	01	gear ratio numerator	Uint32	$1\sim2^{31}-1$	RW	1
	02	gear ratio denominator	Uint32	$1\sim2^{31}-1$	RW	1
2009	01	speed loop gain	Uint16	0~50000	RW	4000
	02	speed loop integration time	Uint16	1~30000	RW	1500
	0F	torque loop gain	Uint16	0~50000	RW	800
	10	torque loop integration time	Uint16	1~10000	RW	500

5.8.2 Related function settings

1）Speed reach output function

Index (Hex)	Subindex (Hex)	Name	Description
606D	00	Speed reaching threshold	When the absolute value of the difference between the target speed 60FF (converted into the motor speed in rpm unit) and the actual motor speed is within 606Dh, and the time set by 606Eh is maintained, the status word 6041h.bit10 is set to 1, and the speed reaches the DO function is valid
606E	00	Speed arrival time window	

5.8.3 Recommended configuration

RPDO	TPDO	Description
6040h：控制字(Control Word)	6041h：状态字(Status Word)	necessary
6060h：模式选择(Modes of Operation)	6061h：运行模式(Modes of Operation Display)	optional
60FFh：目标速度(Target Velocity)		necessary
6083h：轮廓加速度(Profile Acceleration)	6064h：位置反馈(Position Actual Value)	optional
6084h：轮廓减速度(Profile Deceleration)	606Ch：速度反馈(Velocity Actual Value)	optional
	603Fh：错误代码(Error Code)	optional
	60FDh：数字输入(Digital Inputs)	optional

5.9 **Profile Torque Mode (PT)**

In this mode, the host computer sends the target torque 6071h and the torque ramp constant 6087h to the servo drive, and the torque regulation is performed internally by the servo drive. When the speed of the motor reaches the limit value it will enter the speed regulation stage.

5.9.1 Related objects

Control word 6040h		
Bit	Name	Description
0	伺服准备好(Switch On)	When the value of Bit0 to Bit3 is 1, the motor is enabled
1	接通主回路电(Enable Voltage)	
2	快速停机(Quick Stop)	
3	伺服运行(Enable Operation)	
7	复位故障(Reset Fault)	0: no effect 1: Reset drive failure

Status word 6041h		
Bit	Name	Description
10	目标到达 Target Reached	0: Target torque not reached 1: Target torque reached
11	软件内部位置超限 Internal Limit Active	0: Neither the position command nor the position feedback exceeds the limit 1: Position command or position feedback overrun
15	原点回零完成 Home Find	0: Home not completed 1: Home completed

Index (Hex)	Subindex (Hex)	Name	Data type	Setting range	Accessibility	Default value
6040	00	control word	Uint16	0～65535	RW	0
6041	00	status word	Uint16	-	RO	0
6060	00	operating mode	Int16	0～10	RW	8
6061	00	mode display	Int16	-	RO	8
6063	00	position feedback (unit: encoder unit)	Int32	-	RO	-
6064	00	position feedback (unit: command unit)	Int32	-	RO	-
606C	00	actual speed (unit: command unit/s)	Int32	-	RO	-
6071	00	target torque (unit: 0.1%)	Int16	-3000～3000	RW	0
6072	00	maximum torque (unit: 0.1%)	Uint16	0～3000	RW	3000
6074	00	torque command (unit: 0.1%)	Int16	-5000～5000-	RO	-
6077	00	actual torque (unit: 0.1%)	Int16	-5000～5000	RO	-
60FF	00	profile speed (unit: command pulse/s)	Uint32	0～$2^{32}-1$	RW	0
6087	00	Torque ramp (unit: 0.1%/s)	Uint32	0～$2^{32}-1$	RW	3000
2009	01	speed loop gain	Uint16	0～50000	RW	4000

02	speed loop integration time	Uint16	1~30000	RW	1500
0F	torque loop gain	Uint16	0~50000	RW	800
10	torque loop integration time	Uint16	1~10000	RW	500

5.9.2 Related function settings

1） Torque reach output setting

Index (Hex)	Subindex (Hex)	Name	Description
2008	0A	Torque reaches reference value	Torque reaches reference value: A
2008	0B	Torque reaches effective value	Torque reaches effective value: B Torque reaches invalid value: C
2008	0C	Torque reaches invalid value	● When: |torque actual value|> |A + B|, the torque reaches DO is valid, and the status word 6041h.bit10 is set to 1. ● When: |torque actual value| <|A + C|, the torque reaches DO is invalid, and the status word 6041h.bit10 is cleared

5.9.3 Recommended configuration

RPDO	TPDO	Description
6040h：控制字(Control Word)	6041h：状态字(Status Word)	necessary
6060h：模式选择(Modes of Operation)	6061h：运行模式(Modes of Operation Display)	optional
6071h：目标转矩(Target Torque)		necessary
6087h：转矩斜坡(Torque Slope)	6064h：位置反馈(Position Actual Value)	optional
607Fh：最大轮廓速度(Profile Velocity)	606Ch：速度反馈(Velocity Actual Value)	optional
	6077h：转矩反馈(Torque Actual Value)	optional
	603Fh：错误代码(Error Code)	optional
	60FDh：数字输入(Digital Inputs)	optional

5.10 Homing Mode（HM）

The homing mode is used to find the mechanical origin and locate the positional relationship between the mechanical origin and the mechanical zero point.

Mechanical origin: A fixed position on the machine can correspond to a certain origin switch or motor Z-phase signal.

Mechanical zero point: absolute zero position on the machine.

After the homing is completed, the stop position of the motor is the mechanical origin. By setting 607Ch, the relationship between the mechanical origin and the mechanical zero can be set:

Mechanical origin = mechanical zero + 607Ch (origin offset)

When 607Ch = 0, the mechanical origin coincides with the mechanical zero point.

5.10.1 Related objects

Control word 6040h		
Bit	Name	Description
0	伺服准备好(Switch On)	When the value of Bit0 to Bit3 is 1, the motor is enabled
1	接通主回路电(Enable Voltage)	
2	快速停机(Quick Stop)	
3	伺服运行(Enable Operation)	
4	启动回零(Home Start)	0 -> 1: Start home 1: Homing 1 -> 0: End home
7	复位故障(Reset Fault)	0: no effect 1: Reset drive failure
8	暂停 Halt	0: The servo determines whether to start home according to Bit4 setting 1: Servo pauses according to 605Dh setting

Status word 6041h		
Bit	Name	Description
10	目标到达 Target Reached	0: target position not reached 1: target position reached
11	软件内部位置超限 Internal Limit Active	0: Neither the position command nor the position feedback exceeds the limit 1: Position command or position feedback overrun
12	回零 Homing Attained	0: Home unsuccessful 1: Home success, this flag is valid after the servo in homing mode operation (target reach signal) is set
13	回零错误 Homing Error	0: Home no error occurred 1: Home error occurred
15	原点回零完成 Home Find	0: Home not completed 1: Home completed

Index (Hex)	Subindex (Hex)	Name	Data type	Setting range	Accessibility	Default value
6040	00	control word	Uint16	0～65535	RW	0
6041	00	status word	Uint16	-	RO	0
6060	00	operating mode	Int16	0～10	RW	8
6061	00	mode display	Int16	-	RO	8
6062	00	position command (unit: command unit)	Int32	-	RO	-
6063	00	position feedback (unit: encoder unit)	Int32	-	RO	-
6064	00	position feedback (unit: command unit)	Int32	-	RO	-
6065	00	position deviation excess threshold (unit: command units)	Uint32	0～$2^{32}-1$	RW	393216

6067	00	position reach threshold (unit: encoder units)	Uint32	0～65535	RW	92
6068	00	position arrival time window (unit: ms)	Uint16	0～65535	RW	10
606C	00	actual speed (unit: command unit/s)	Int32	-	RO	-
6072	00	maximum torque (unit: 0.1%)	Uint16	0～3000	RW	3000
6077	00	actual torque (unit: 0.1%)	Int16	-5000～5000	RO	-
6091	01	gear ratio numerator	Uint32	$1～2^{31}-1$	RW	1
	02	gear ratio denominator	Uint32	$1～2^{31}-1$	RW	1
6099	01	Search deceleration point signal speed (unit: command unit/s)	Uint32	$1～2^{31}-1$	RW	10000
	02	Search origin signal speed (unit: command unit/s)	Uint32	$1～2^{31}-1$	RW	2000
609A	00	acceleration (unit: command unit/s ^{2})	Uint32	$0～2^{32}-1$	RW	100000
60F4	00	position deviation (unit: command units)	Int32	-	RO	-
2009	01	speed loop gain	Uint16	0～50000	RW	4000
	02	speed loop integration time	Uint16	1～30000	RW	1500
	03	position loop gain	Uint16	0～50000	RW	800
	0F	torque loop gain	Uint16	0～50000	RW	800
	10	torque loop integration time	Uint16	1～10000	RW	500

5.10.2 Introduction to Home pperation

1）Object 6098h = 17

Origin: reverse limit switch

Deceleration point: reverse limit switch
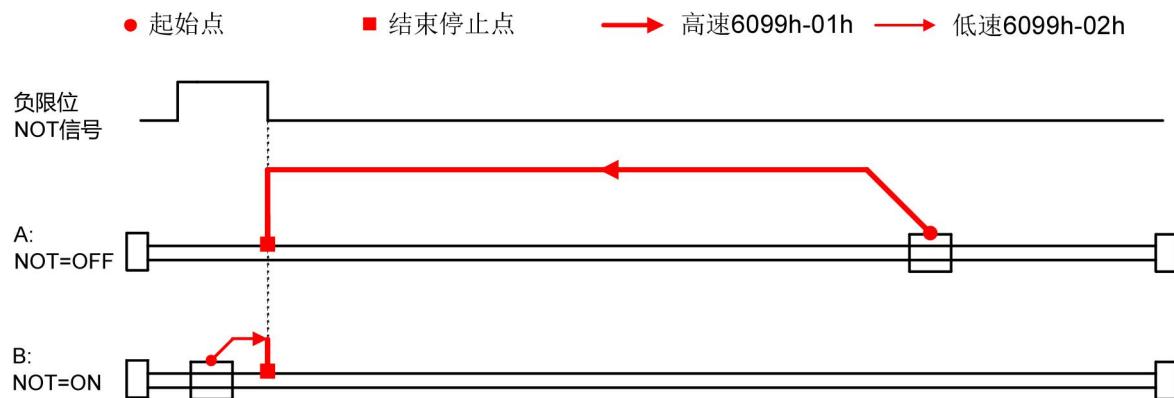
2）Object 6098h = 18

Origin: positive limit switch

Deceleration point: positive limit switch
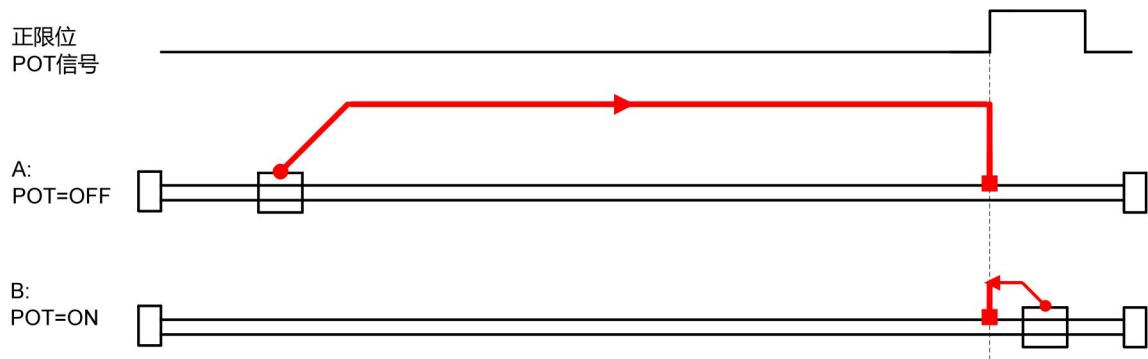
3） Object 6098h = 19

Origin: origin switch

Deceleration point: origin switch
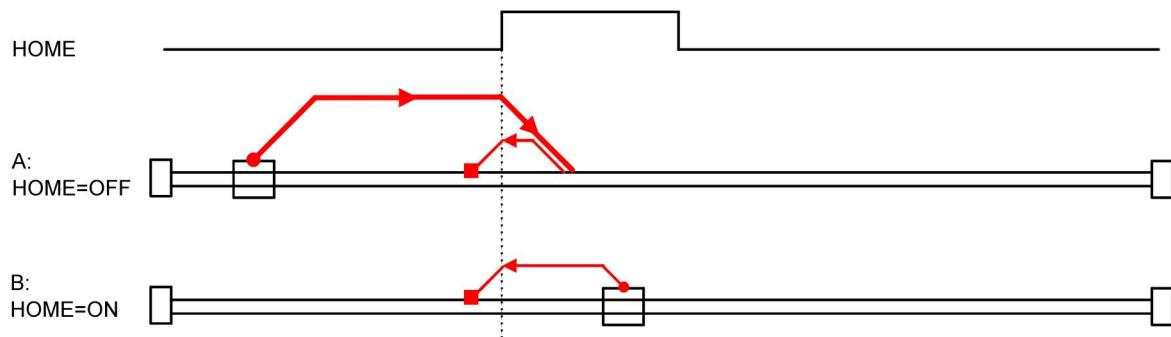
4） Object 6098h = 20

Origin: origin switch

Deceleration point: origin switch
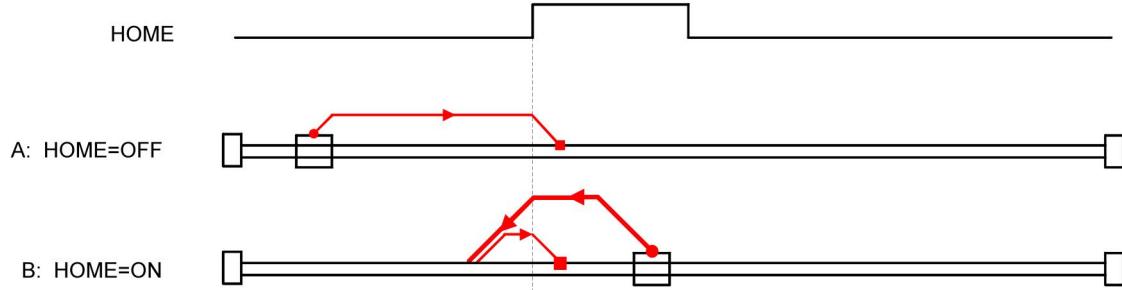
5） Object 6098h = 21

Origin: origin switch

Deceleration point: origin switch
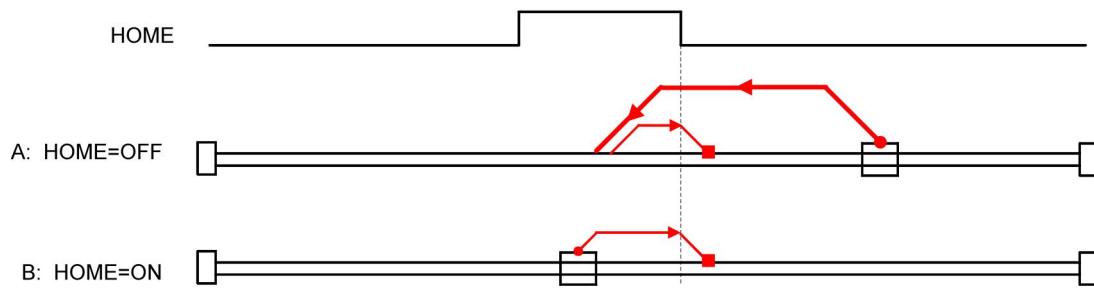
6） Object 6098h = 22

Origin: origin switch

Deceleration point: origin switch
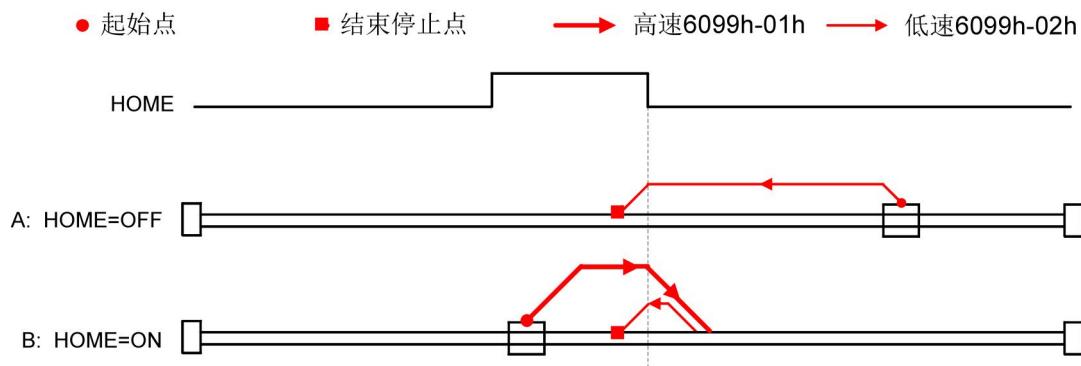
7） Object 6098h = 23

Origin: origin switch

Deceleration point: origin switch
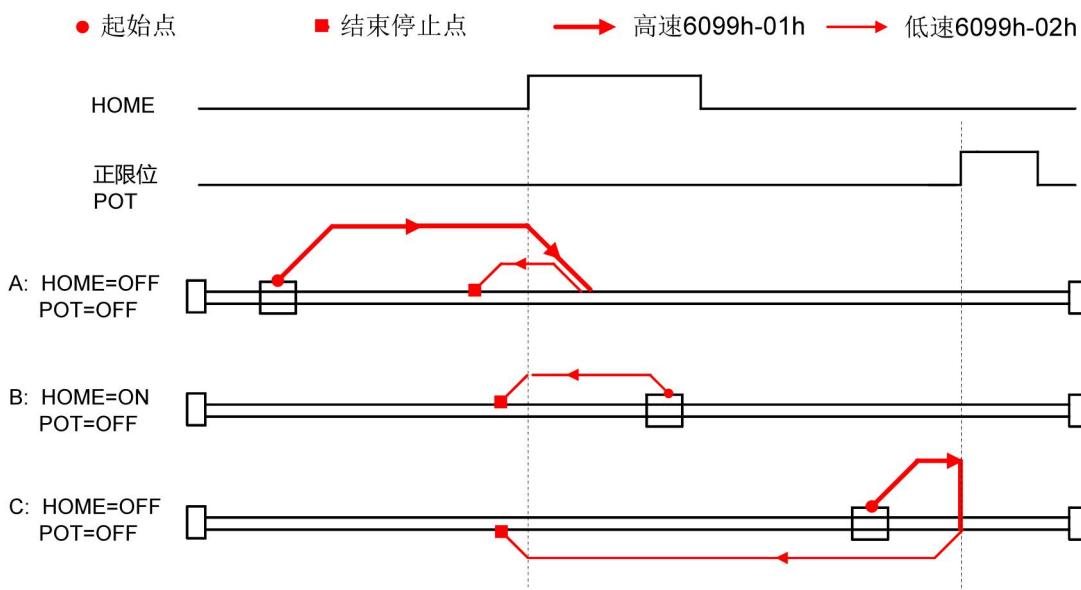
8） Object 6098h = 24

Origin: origin switch

Deceleration point: origin switch
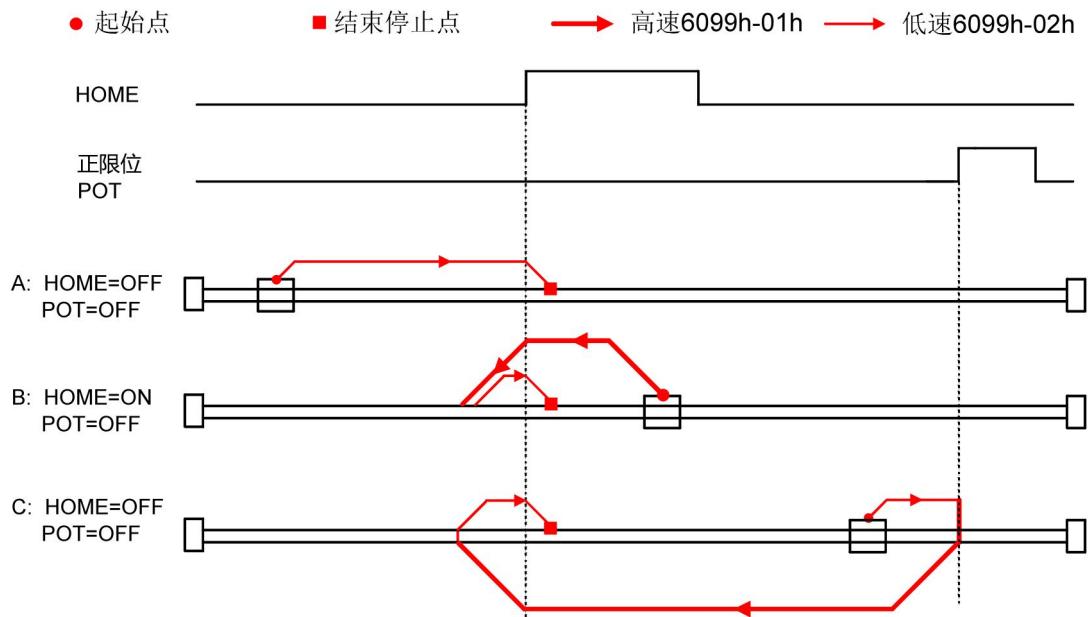
9） Object 6098h = 25

Origin: origin switch

Deceleration point: origin switch
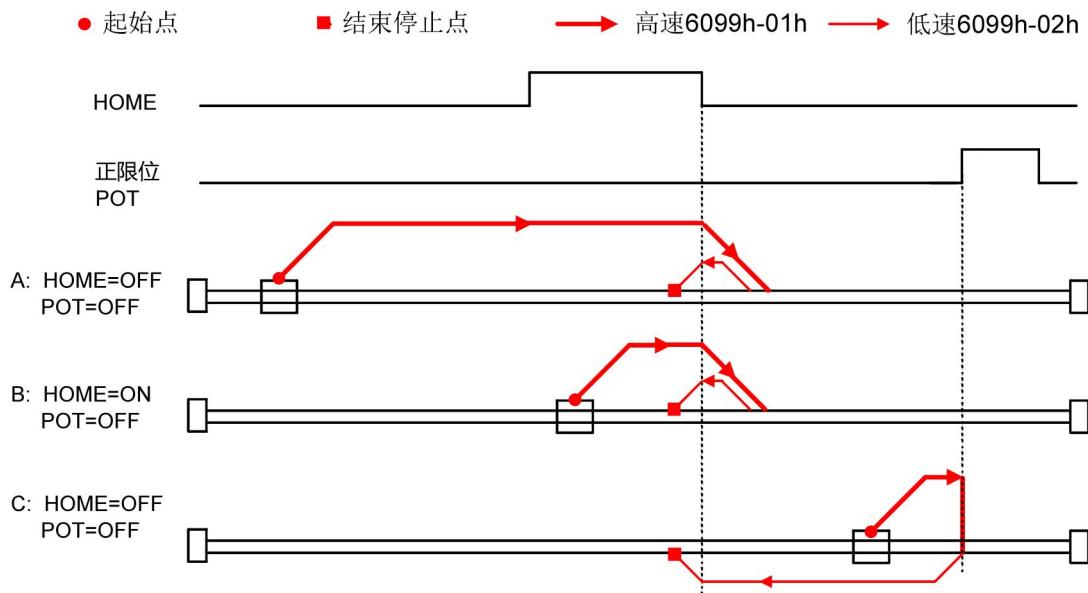
10） Object 6098h = 26

Origin: origin switch

Deceleration point: origin switch
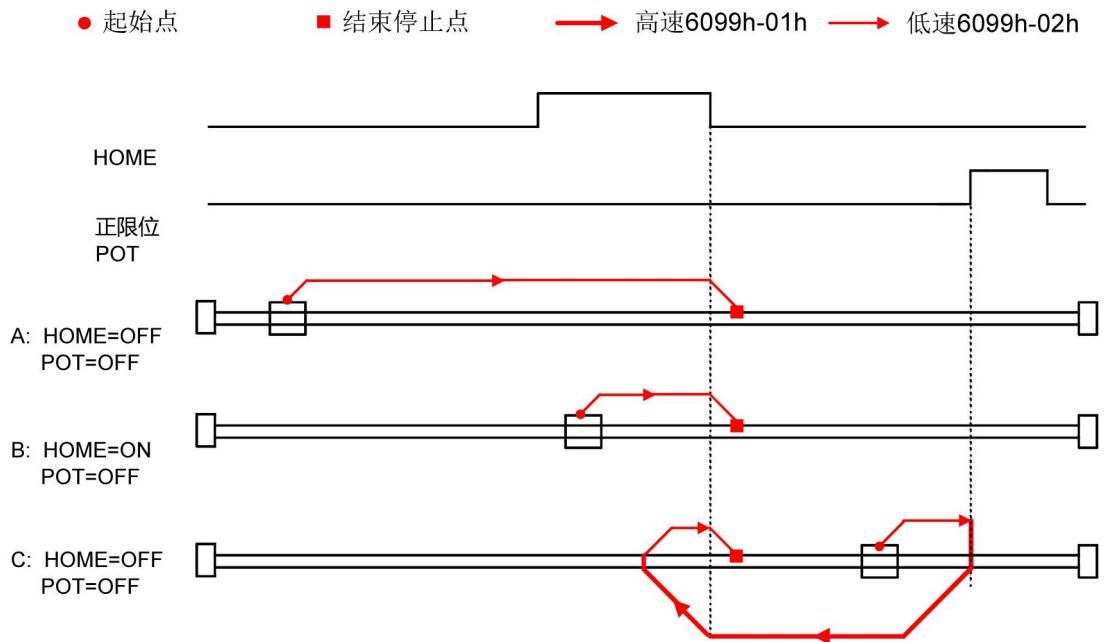
11） Object 6098h = 27

Origin: origin switch

Deceleration point: origin switch
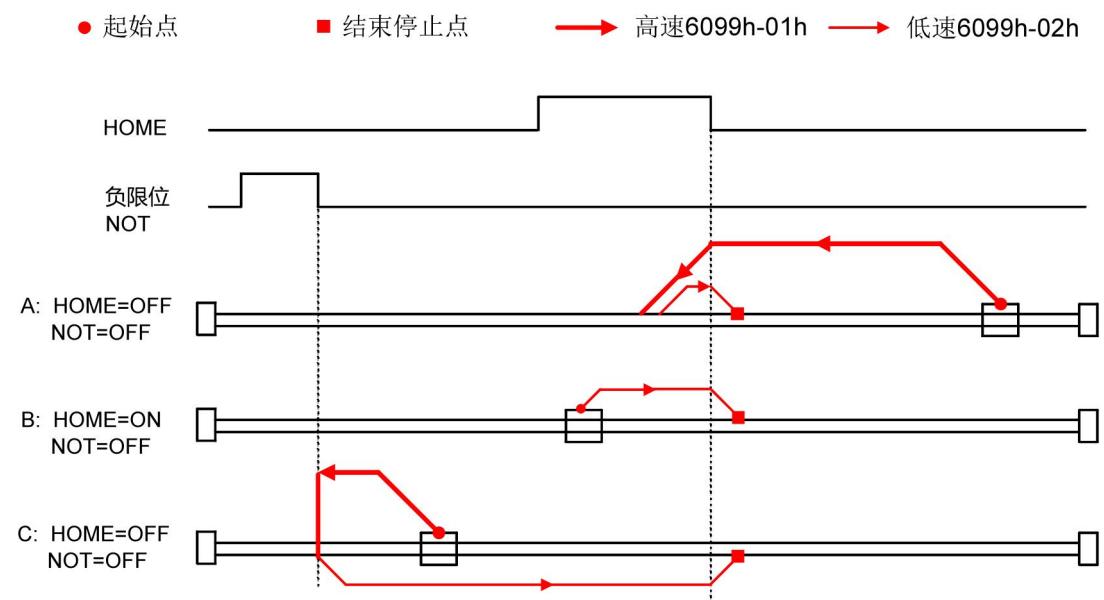
12） Object 6098h = 28

Origin: origin switch

Deceleration point: origin switch
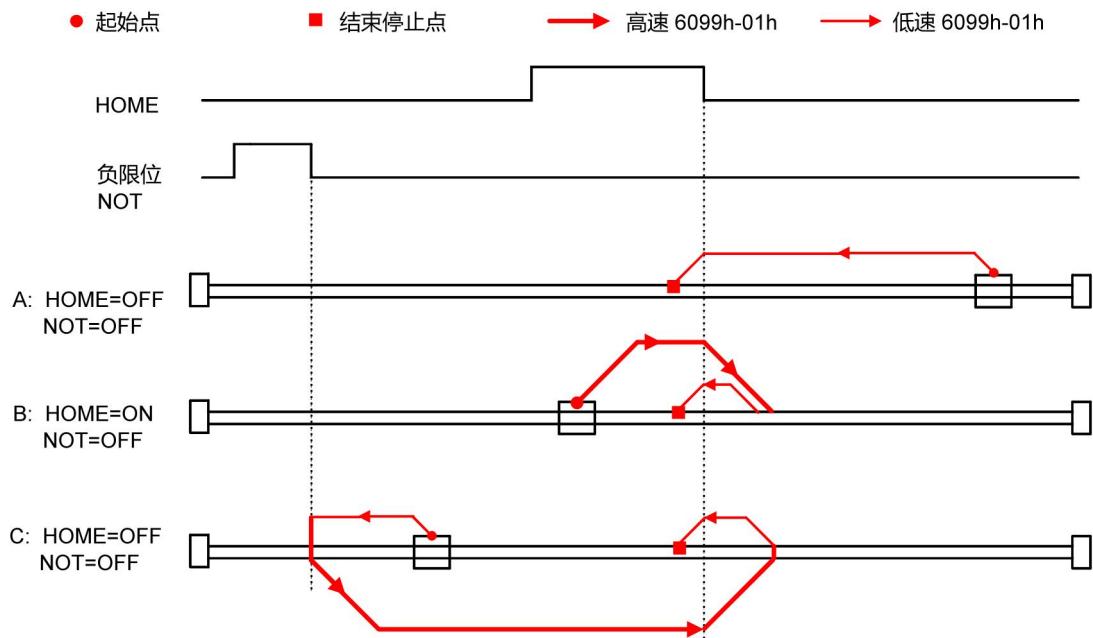
13） Object 6098h = 29

Origin: origin switch

Deceleration point: origin switch
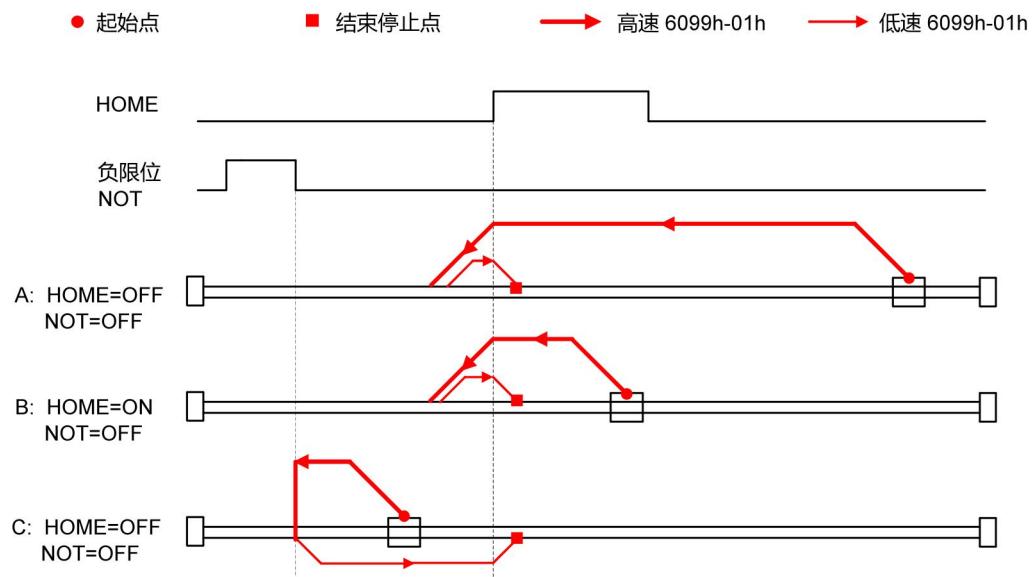
14） Object 6098h = 30

Origin: origin switch

Deceleration point: origin switch
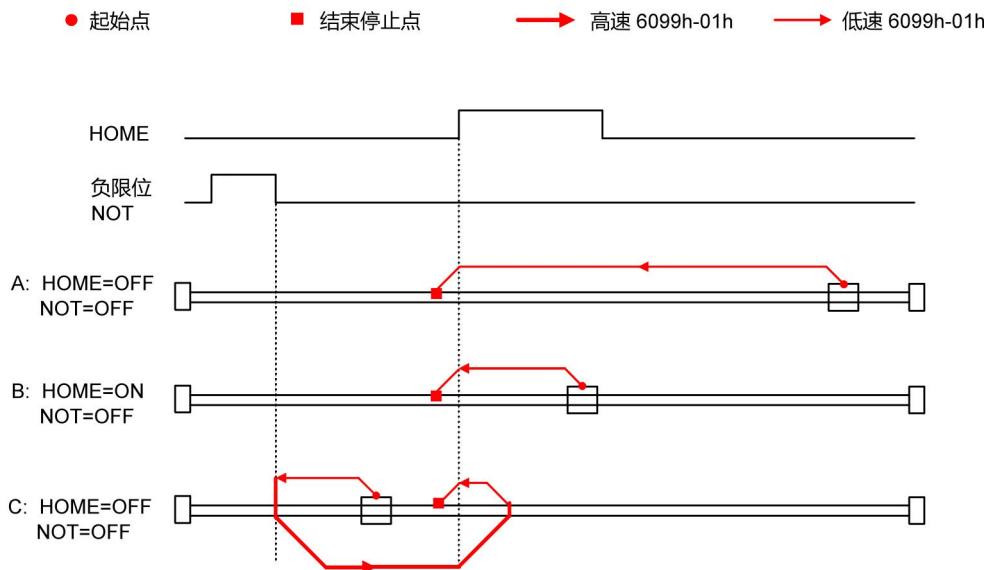
15） Object 6098h = 35

Taking the current position as the mechanical origin, after triggering the origin return to zero (6040h control word: 0x0F -> 0x1F), the position feedback 6064h is set to the origin offset 607Ch.
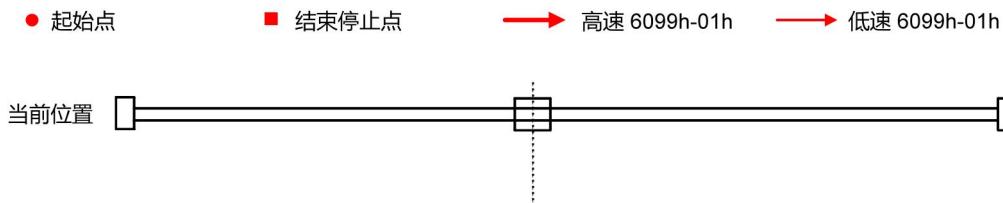
5.10.3 Recommended configuration

RPDO	TPDO	Description
6040h：控制字(Control Word)	6041h：状态字(Status Word)	necessary
6060h：模式选择(Modes of Operation)	6061h：运行模式(Modes of Operation Display)	optional
6098h：回零方式(Homing Method)		optional
6099-01h：搜索减速点信号速度(Speed during search for switch)		optional
6099-02h：搜索原点信号速度(Speed during search for zero)	603Fh：错误代码(Error Code)	optional
609Ah：回零加速度(Homing acceleration)	60FDh：数字输入(Digital Inputs)	optional

5.11 **Introduction of auxiliary functions**

5.11.1 Probe function

The probe function latches the motor position information through the digital input port. The function and polarity of the digital input port of DRV EtherCAT driver can be defined by index 0x2004.

The relevant object dictionary of the probe function is as follows:

Index	Object description	Description
0x60B8	Probe function setting	Touch Probe Function
0x60B9	Probe status	Touch Probe Status
0x60BA	Probe 1 rising edge latch position	Touch Probe Position 1 Positive Value
0x60BB	Probe 1 falling edge latch position	Touch Probe Position 1 Negative Value
0x60BC	Probe 2 rising edge latch position	Touch Probe Position 2 Positive Value
0x60BD	Probe 2 falling edge latch position	Touch Probe Position 2 Negative Value
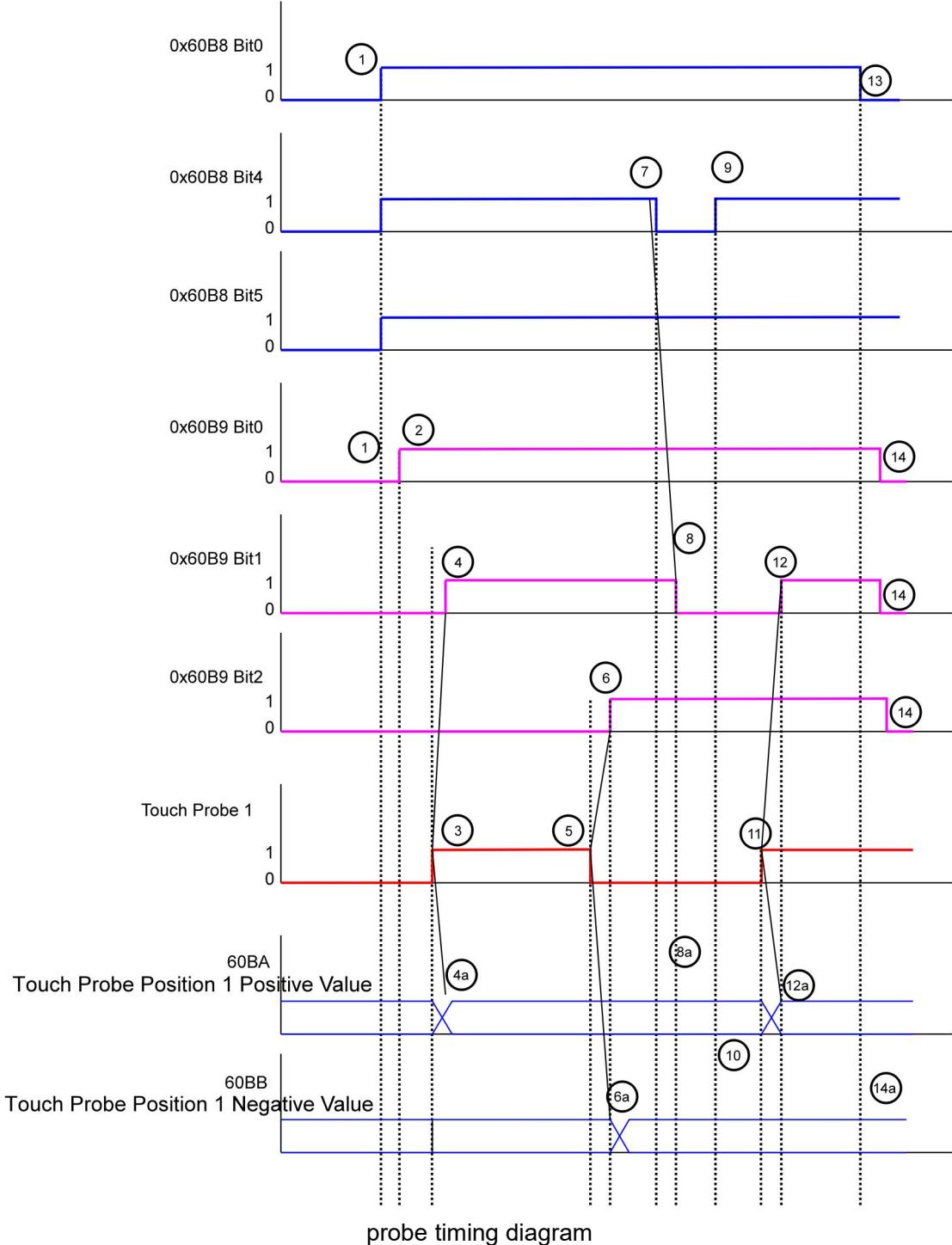
probe timing diagram

No.	Register Changes	Probe action
1	60B8 Bit 0 = 1	Enable Probe 1
	60B8 Bit 1,4,5	Configure enable probe rising and falling edges
2	-> 60B9 Bit 0 = 1	Status "Probe 1 Enable" is set
3		External Probe Signal Rising Edge
4	-> 60B9 Bit 1 = 1	Status "Probe 1 rising edge latch" is set
4a	-> 60BA	Probe 1 positive position is latched
5		External Probe Signal Falling Edge
6	-> 60B9 Bit 2 = 1	Status "Probe 1 falling edge latch" is set
6a	-> 60BB	Probe 1 negative position is latched
7	-> 60B8 Bit：4	Rising edge latching function: disabled

8	-> 60B9 Bit 0 = 0	Status "Probe 1 rising edge latch" is cleared
8a	-> 60BA	Probe 1 positive position, no change in latch position
9	-> 60B8 Bit 4 = 1	Rising edge latching function: Enabled
10	-> 60BA	Probe 1 positive position, no change in latch position
11		External Probe Signal Rising Edge
12	-> 60B9 Bit 1 = 1	Status "Probe 1 rising edge latch" is set
12a	-> 60BA	Probe 1 positive position is latched
13	-> 60B8 Bit 0 = 0	Probe 1 function: disabled
14	-> 60B9 Bit 0,1,2 = 0	Status bits are cleared
14a	-> 60BA,60BB	No change in Probe 1 positive/negative latch position

probe timing description

Chapter 6 Object dictionary

6.1 **Object dictionary classification description**

The object dictionary is the most important part of the device specification. It is an ordered collection of a set of parameters and variables, including all parameters of device description and device network status, and a set of objects that can be accessed through the network in an orderly and predefined manner.

The CANopen protocol uses an object dictionary with a 16-bit index and an 8-bit sub-index. The structure of the object dictionary is shown in the following table.

Index	Object
0000h	Unused
0001h～001Fh	Static data types (standard data types, such as Boolean, Integer16)
0020h～003Fh	Complex data types (predefined structures composed of simple types such as PDOCommPar, SDOParmeter)
0040h～005Fh	Complex data types specified by the manufacturer
0060h～007Fh	Static data type specified by the device sub-protocol
0080h～009Fh	Complex data types specified in the device sub-protocol
00A0h～0FFFh	Reserve
1000h～1FFFh	Communication sub-protocol area (e.g. device type, error register, number of supported PDOs)
2000h～5FFFh	Manufacturer-specific sub-protocol area (e.g. function code mapping)
6000h～9FFFh	Standard equipment sub-protocol area (e.g. DSP-402 protocol)
A000h～FFFFh	Reserve

The DRV series servo drive object contains the following attributes:
- Index
- Subindex
- Data structure
- Data type
- Accessibility
- Map
- Setting effective
- Related models
- Data range
- Factory setting

■ Noun Interpretation

The position of the object dictionary in the parameter table is specified by "index" and "subindex".

"Index": Specify the position of the same type of object in the object dictionary, expressed in hexadecimal.

"Subindex": Under the same index, it contains multiple objects, and the offset of each object under this category

The description of each object in the object dictionary is described by category. For example, there is an object 6091h for electronic gear ratio setting in the object dictionary, which respectively describes the numerator and denominator of the electronic gear ratio. The objects are defined as follows:

Index	Subindex	Name	Meaning
6091h	00h	Number of elements	The number of object data, not including itself
6091h	01h	Index 1	Electronic gear ratio numerator
6091h	02h	Index 2	Electronic gear ratio denominator

"Data structure":

Category	Meaning	DS301 value
VAR	A single simple value, including data types Int8, Uint16, String, etc.	7
ARR	Have same types of data blocks	8
REC	Have different types of data blocks	9

"Data type":

Data type	Value range	Data length	DS301 value
Int8	-128～+127	1 byte	0002
Int16	-32768～+32767	2 bytes	0003
Int32	-2147483648～+2147483647	4 bytes	0004
Uint8	0～255	1 byte	0005
Uint16	0～65535	2 bytes	0006
Uint32	0～4294967295	4 bytes	0007
String	ASCII	-	0009

"Accessibility":

Accessibility	Description
RW	Can read and write
WO	Write only
RO	Read only

"Map":

Map	Description
NO	Can not be mapped in PDO
RPDO	Can be used as RPDO
TPDO	Can be used as TPDO

"Related models":

Related models	Description
-	Parameters are independent of control mode
ALL	Parameters are related to all control modes
PP/PV/PT/HM/CSP/CSV/CST	Parameters are related in the corresponding mode

"Data range": Data upper and lower limits of parameters with writable attributes

"Factory setting": Parameter default value

6.2 **Detailed description of communication parameters (group 1000h)**

Index 1000h	Name	Equipment type					Data structure	VAR	Data type	Uint32
	Data range	-	Factory setting	0x00020192	Accessibility	RO	Related models	-	Map	NO

Description of the CoE device sub-protocol type

Bit	Name	Description
0～15	device sub-protocol	402（192h: device sub-protocol
16～23	type	02: servo driver
25～31	mode	manufacturer customization

Index 1008h	Name	Manufacturer equipment name					Data structure	-	Data type	-
	Data range	-	Factory setting	Determined by model	Accessibility	RO	Related models	-	Map	NO

Index 1009h	Name	Manufacturer hardware version					Data structure	-	Data type	-
	Data range	-	Factory setting	Determined by version	Accessibility	RO	Related models	-	Map	NO

Index 100Ah	Name	Manufacturer software version					Data structure	-	Data type	-
	Data range	-	Factory setting	Determined by version	Accessibility	RO	Related models	-	Map	NO

Index 1018h	Name	ID object					Data structure	REC	Data type	OD 类型
	Data range	ODData range	Factory setting	OD default value	Accessibility	RO	Related models	-	Map	NO
Subindex 00h	Name	The largest subindex number contained in the ID object					Data structure	-	Data type	Uint8
	Data range	4	Factory setting	4	Accessibility	RO	Related models	-	Map	NO
Subindex 01h	Name	Manufacturer ID					Data structure	-	Data type	Uint32
	Data range	-	Factory setting	0x0A880000	Accessibility	RO	Related models	-	Map	NO
Subindex 02h	Name	Product code					Data structure	-	Data type	Uint32
	Data range	-	Factory setting	0x00100000	Accessibility	RO	Related models	-	Map	NO
Subindex 03h	Name	Revision number					Data structure	-	Data type	Uint32
	Data range	-	Factory setting	0x00010A88	Accessibility	RO	Related models	-	Map	NO
Subindex 04h	Name	Product serial number					Data structure	-	Data type	Uint32
	Data range	-	Factory setting	0x00000000	Accessibility	RO	Related models	-	Map	NO

Index 1600h	Name	RPDO1 mapping object					Data structure	REC	Data type	Uint8
	Data range	ODData range	Factory setting	OD default value	Accessibility	RW	Related models	ALL	Map	NO
Subindex 00h	Name	Number of mapping objects supported by RPDO1					Data structure	-	Data type	Uint8
	Data range	0～12	Factory setting	3	Accessibility	RW	Related models	ALL	Map	NO
Subindex 01h	Name	The first mapping object					Data structure	-	Data type	Uint8
	Data range	0～4294967295	Factory setting	0x60400010	Accessibility	RW	Related models	ALL	Map	NO
Subindex 02h	Name	The second mapping object					Data structure	-	Data type	Uint8
	Data range	0～4294967295	Factory setting	0x607A0020	Accessibility	RW	Related models	ALL	Map	NO
Subindex 03h	Name	The third mapped object					Data structure	-	Data type	Uint8
	Data range	0～4294967295	Factory setting	0x60B80010	Accessibility	RW	Related models	ALL	Map	NO

	Name			The 4th to 12th mapping objects			Data structure	-	Data type	Uint8
Subindex 04～0Ch	Data range	0～4294967295	Factory setting	-	Accessibility	RW	Related models	ALL	Map	NO

	Name			RPDO2 mapping object			Data structure	REC	Data type	Uint32
Index 1601h	Data range	ODData range	Factory setting	OD default value	Accessibility	RW	Related models	ALL	Map	NO
Subindex 00h	Name			Number of mapping objects supported by RPDO2			Data structure	-	Data type	Uint8
	Data range	0～12	Factory setting	6	Accessibility	RW	Related models	ALL	Map	NO
Subindex 01h	Name			The first mapping object			Data structure	-	Data type	Uint32
	Data range	0～4294967295	Factory setting	0x60400010	Accessibility	RW	Related models	ALL	Map	NO
Subindex 02h	Name			The second mapping object			Data structure	-	Data type	Uint32
	Data range	0～4294967295	Factory setting	0x607A0020	Accessibility	RW	Related models	ALL	Map	NO
Subindex 03h	Name			The third mapping object			Data structure	-	Data type	Uint32
	Data range	0～4294967295	Factory setting	0x60810020	Accessibility	RW	Related models	ALL	Map	NO
Subindex 04h	Name			The fourth mapping object			Data structure	-	Data type	Uint32
	Data range	0～4294967295	Factory setting	0x60830020	Accessibility	RW	Related models	ALL	Map	NO
Subindex 05h	Name			The fifth mapping object			Data structure	-	Data type	Uint32
	Data range	0～4294967295	Factory setting	0x60840020	Accessibility	RW	Related models	ALL	Map	NO
Subindex 06h	Name			The sixth mapping object			Data structure	-	Data type	Uint32
	Data range	0～4294967295	Factory setting	0x60600008	Accessibility	RW	Related models	ALL	Map	NO
Subindex 07～0Ch	Name			The 7th to 12th mapping objects			Data structure	-	Data type	Uint32
	Data range	0～4294967295	Factory setting	-	Accessibility	RW	Related models	ALL	Map	NO

	Name			RPDO3 mapping object			Data structure	REC	Data type	Uint32
Index 1602h	Data range	ODData range	Factory setting	OD default value	Accessibility	RW	Related models	ALL	Map	NO
Subindex 00h	Name			Number of mapping objects supported by RPDO3			Data structure	-	Data type	Uint8
	Data range	0～12	Factory setting	5	Accessibility	RW	Related models	ALL	Map	NO
Subindex 01h	Name			The first mapping object			Data structure	-	Data type	Uint32
	Data range	0～4294967295	Factory setting	0x60400010	Accessibility	RW	Related models	ALL	Map	NO
Subindex 02h	Name			The second mapping object			Data structure	-	Data type	Uint32
	Data range	0～4294967295	Factory setting	0x60830020	Accessibility	RW	Related models	ALL	Map	NO
Subindex 03h	Name			The third mapping object			Data structure	-	Data type	Uint32
	Data range	0～4294967295	Factory setting	0x60840020	Accessibility	RW	Related models	ALL	Map	NO
Subindex 04h	Name			The fourth mapping object			Data structure	-	Data type	Uint32
	Data range	0～4294967295	Factory setting	0x60FF0020	Accessibility	RW	Related models	ALL	Map	NO
Subindex 05h	Name			The fifth mapping object			Data structure	-	Data type	Uint32
	Data range	0～4294967295	Factory setting	0x60600008	Accessibility	RW	Related models	ALL	Map	NO
Subindex 06～0Ch	Name			The 6th to 12th mapping objects			Data structure	-	Data type	Uint32
	Data range	0～4294967295	Factory setting	-	Accessibility	RW	Related models	ALL	Map	NO

	Name			TPDO1 mapping object			Data structure	REC	Data type	Uint32
Index 1A00h	Data range	ODData range	Factory setting	OD default value	Accessibility	RW	Related models	ALL	Map	NO
Subindex 00h	Name			Number of mapping objects supported by TPDO1			Data structure	-	Data type	Uint8
	Data	0～12	Factory	7	Accessib	RW	Related	ALL	Map	NO

	range		setting		ility		models			
Subindex 01h	Name	The first mapping object					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	0x603F0010	Accessibility	RW	Related models	ALL	Map	NO
Subindex 02h	Name	The second mapping object					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	0x60410010	Accessibility	RW	Related models	ALL	Map	NO
Subindex 03h	Name	The third mapping object					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	0x60610008	Accessibility	RW	Related models	ALL	Map	NO
Subindex 04h	Name	The fourth mapping object					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	0x60640020	Accessibility	RW	Related models	ALL	Map	NO
Subindex 05h	Name	The fifth mapping object					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	0x60B90010	Accessibility	RW	Related models	ALL	Map	NO
Subindex 06h	Name	The sixth mapping object					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	0x60BA0020	Accessibility	RW	Related models	ALL	Map	NO
Subindex 07h	Name	The seventh mapping object					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	0x60FD0020	Accessibility	RW	Related models	ALL	Map	NO
Subindex 08~0Ch	Name	The 8th to 12th mapping objects					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	-	Accessibility	RW	Related models	ALL	Map	NO

Index 1A00h	Name	TPDO2 mapping object					Data structure	REC	Data type	Uint32
	Data range	ODData range	Factory setting	OD default value	Accessibility	RW	Related models	ALL	Map	NO
Subindex 00h	Name	Number of mapping objects supported by TPDO2					Data structure	-	Data type	Uint8
	Data range	0~12	Factory setting	4	Accessibility	RW	Related models	ALL	Map	NO
Subindex 01h	Name	The first mapping object					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	0x60410010	Accessibility	RW	Related models	ALL	Map	NO
Subindex 02h	Name	The second mapping object					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	0x60610008	Accessibility	RW	Related models	ALL	Map	NO
Subindex 03h	Name	The third mapping object					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	0x606C0020	Accessibility	RW	Related models	ALL	Map	NO
Subindex 04h	Name	The fourth mapping object					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	0x60FD0020	Accessibility	RW	Related models	ALL	Map	NO
Subindex 05~0Ch	Name	The 5th to 12th mapping objects					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	-	Accessibility	RW	Related models	ALL	Map	NO

Index 1A00h	Name	TPDO3 mapping object					Data structure	REC	Data type	Uint32
	Data range	ODData range	Factory setting	OD default value	Accessibility	RW	Related models	ALL	Map	NO
Subindex 00h	Name	Number of mapping objects supported by TPDO3					Data structure	-	Data type	Uint8
	Data range	0~12	Factory setting	0	Accessibility	RW	Related models	ALL	Map	NO
Subindex 00~0Ch	Name	The 1st to 12th mapping objects					Data structure	-	Data type	Uint32
	Data range	0~4294967295	Factory setting	-	Accessibility	RW	Related models	ALL	Map	NO

Index 1C00h	Name	Synchronous management communication type					Data structure	REC	Data type	OD type
	Setting range	OD Data range	Factory setting	OD default value	Accessibility	RO	Related models	-	Map	NO
Subindex	Name	The largest subindex number of the synchronous management communication type					Data structure	-	Data type	Uint8

00h	Data range	-	Factory setting	4	Accessibility	RO	Related models	-	Map	NO
Subindex 01h	Name		SM0 communication type				Data structure	-	Data type	Uint8
	Data range	-	Factory setting	0x01	Accessibility	RO	Related models	-	Map	NO
Subindex 02h	Name		SM1 communication type				Data structure	-	Data type	Uint8
	Data range	-	Factory setting	0x02	Accessibility	RO	Related models	-	Map	NO
Subindex 03h	Name		SM2 communication type				Data structure	-	Data type	Uint8
	Data range	-	Factory setting	0x03	Accessibility	RO	Related models	-	Map	NO
Subindex 04h	Name		SM3 communication type				Data structure	-	Data type	Uint8
	Data range	-	Factory setting	0x04	Accessibility	RO	Related models	-	Map	NO

Index 1C12h	Name		Synchronization manager 2 RPDO allocation				Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	RW	Related models	-	Map	NO
Subindex 00h	Name		Synchronization manager 2 RPDO assigns the largest subindex number				Data structure	-	Data type	Uint8
	Data range	0~1	Factory setting	1	Accessibility	RW	Related models	ALL	Map	NO
Subindex 01h	Name		Index of the object allocated by RPDO				Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	0x1600	Accessibility	RW	Related models	-	Map	NO
Set the index of the RPDO allocation object										

Index 1C13h	Name		Synchronization manager 3 TPDO allocation				Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	RW	Related models	-	Map	NO
Subindex 00h	Name		Synchronization manager 3 TPDO assigns the largest subindex number				Data structure	-	Data type	Uint8
	Data range	0~1	Factory setting	1	Accessibility	RW	Related models	ALL	Map	NO
Subindex 01h	Name		Index of the object allocated by TPDO				Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	0x1A00	Accessibility	RW	Related models	-	Map	NO
Set the index of the TPDO allocation object										

Index 1C32h	Name		Synchronization manager 2 synchronization output parameters				Data structure	REC	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	RO	Related models	-	Map	NO
Subindex 00h	Name		The maximum subindex number of the synchronization output parameter of the synchronization manager 2				Data structure	-	Data type	Uint8
	Data range	-	Factory setting	32	Accessibility	RO	Related models	-	Map	NO
Subindex 01h	Name		Synchronization type				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	2	Accessibility	RO	Related models	-	Map	NO
0x0002 indicates that the synchronization type of SM2 is distributed clock synchronization 0 mode (DC SYNC Mode)										
Subindex 02h	Name		Cycle time (unit: ns)				Data structure	-	Data type	Uint32
	Data range	-	Factory setting	0x003D0900	Accessibility	RO	Related models	-	Map	NO
Reflect the cycle of DC SYNC 0										
Subindex 04h	Name		Supported synchronization types				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	0x401F	Accessibility	RO	Related models	-	Map	NO
Reflect the type of distributed clock 0x0004 represents the distributed clock synchronization 0 mode (DC SYNC 0 Mode)										
Subindex 05h	Name		Minimum cycle time (unit: ns)				Data structure	-	Data type	Uint32
	Data range	-	Factory setting	0xE8480000	Accessibility	RO	Related models	-	Map	NO
Subindex 06h	Name		Calculation and replication time (unit: ns)				Data structure	-	Data type	Uint32
	Data range	-	Factory setting	0	Accessibility	RO	Related models	-	Map	NO

Reflects the time when the microprocessor copies data from the synchronization manager to the local.

Subindex 09h	Name	Delay time (unit: ns)					Data structure	-	Data type	Uint32
	Data range	-	Factory setting	0	Accessibility	RO	Related models	-	Map	NO
Subindex 20h	Name	Sync error					Data structure	-	Data type	Bool
	Data range	-	Factory setting	0	Accessibility	RO	Related models	-	Map	NO

Reflect whether a synchronization error occurs currently:
TRUE: synchronization is activated and no synchronization error occurs
FALSE: Synchronization is not activated or a synchronization error has occurred

Index 1C33h	Name	Synchronization management 3 synchronization input parameters					Data structure	REC	Data type	OD type
	Data range	OD Data range	Factory setting	-	Accessibility	RO	Related models	-	Map	NO
Subindex 00h	Name	The maximum subindex number of the synchronization input parameter of the synchronization manager 3					Data structure	-	Data type	Uint8
	Data range	-	Factory setting	32	Accessibility	RO	Related models	-	Map	NO
Subindex 01h	Name	Synchronization type					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	2	Accessibility	RO	Related models	-	Map	NO

0x0002 indicates that the synchronization type of SM2 is distributed clock synchronization 0 mode (DC SYNC Mode)

Subindex 01h	Name	Cycle time (unit: ns)					Data structure	-	Data type	Uint32
	Data range	-	Factory setting	0x003D0900	Accessibility	RO	Related models	-	Map	NO
Subindex 04h	Name	Supported synchronization types					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	0x401F	Accessibility	RO	Related models	-	Map	NO

Reflect the type of distributed clock
0x0004 represents the distributed clock synchronization 0 mode (DC SYNC 0 Mode)

Subindex 05h	Name	Minimum cycle time (unit: ns)					Data structure	-	Data type	Uint32
	Data range	-	Factory setting	0xE8480000	Accessibility	RO	Related models	-	Map	NO
Subindex 06h	Name	Calculation and replication time (unit: ns)					Data structure	-	Data type	Uint32
	Data range	-	Factory setting	0x00000001	Accessibility	RO	Related models	-	Map	NO
Subindex 09h	Name	Delay time (unit: ns)					Data structure	-	Data type	Uint32
	Data range	-	Factory setting	0x0000	Accessibility	RO	Related models	-	Map	NO
Subindex 20h	Name	Sync error					Data structure	-	Data type	Bool
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

6.3 Detailed description of manufacturer-defined parameters (group 2000h)

6.3.1 Servo motor parameters

Index 2000h	Name	Servo motor parameter					Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	-	Map	NO

Subindex 00h	Name	Maximum subindex number					Data structure	-	Data type	Uint8
	Data range	-	Factory setting	14	Accessibility	RO	Related models	-	Map	NO

Subindex 01h	Name	Motor ID					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

Subindex 02h	Name	Motor rated power (unit: 0.01KW)					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

Subindex 03h	Name	Motor rated voltage (unit: V)					Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

Subindex 04h	Name	Motor rated current (unit: 0.1A)					Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

Subindex 05h	Name	Motor rated speed (unit: rpm)					Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

Subindex 06h	Name	Motor max speed (unit: rpm）					Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

Subindex 07h	Name	Motor rated torque (unit: 0.01Nm)					Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

Subindex 08h	Name	Motor max torque (unit: 0.01Nm)					Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

Subindex 09h	Name	Motor moment of inertia (unit: 0.01Kg.cm)					Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

Subindex 0Ah	Name	Number of motor pole pairs (unit: pole pairs)					Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

Subindex 0Bh	Name	Motor wire resistance (unit: 0.001Ω)					Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

Subindex 0Ch	Name	Motor Q-axis inductance (unit: 0.01mH)					Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

Subindex 0Dh	Name	Motor D-axis inductance (unit: 0.01mH)					Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

Subindex 0Eh	Name	Motor torque constant (unit: 0.01Nm/A)					Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	Determined by model	Accessibility	RW	Related models	-	Map	NO

6.3.2 Drive parameters

Index 2001h	Name	Drive parameters					Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	-	Map	NO

Subindex 00h	Name	Maximum subindex number					Data structure	-	Data type	Uint8
	Data range	-	Factory setting	3	Accessibility	RO	Related models	-	Map	NO

Subindex 01h	Name	MCU software version number					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 02h	Name	FPGA software version number					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 03h	Name	EtherCAT software version number				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

6.3.3 Encoder parameters

Index 2002h	Name	Encoder parameters				Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	-	Map	NO

Subindex 00h	Name	Maximum subindex number				Data structure	-	Data type	Uint8
	Data range	-	Factory setting	10	Accessibility	RO	Related models	-	Map	NO

Subindex 01h	Name	Encoder type				Data structure	-	Data type	Uint16
	Data range	0~2	Factory setting	2	Accessibility	RW	Related models	-	Map	NO

Set the encoder type:
0: Reserved
1: Multiturn absolute encoder
2: Single-turn absolute encoder

Subindex 02h	Name	Motor encoder zero offset				Data structure	-	Data type	Uint32
	Data range	$0\sim2^{32}-1$	Factory setting	0	Accessibility	RW	Related models	-	Map	NO

Subindex 03h	Name	Encoder resolution (unit: bit)				Data structure	-	Data type	Uint16
	Data range	0~23	Factory setting	17	Accessibility	RW	Related models	-	Map	NO

Subindex 04h	Name	Prohibit multiturn absolute encoder battery failure alarm				Data structure	-	Data type	Uint16
	Data range	0~1	Factory setting	0	Accessibility	RW	Related models	-	Map	NO

Subindex 05h	Name	Resolution of multiturn absolute encoder (unit: bit)				Data structure	-	Data type	Uint16
	Data range	0~23	Factory setting	16	Accessibility	RW	Related models	-	Map	NO

Subindex 06h	Name	Motor power-on and lock shaft torque (unit: %)				Data structure	-	Data type	Uint16
	Data range	0~300	Factory setting	90	Accessibility	RW	Related models	-	Map	NO

Subindex 07h	Name	Set the current position of the multiturn absolute encoder as zero				Data structure	-	Data type	Uint16
	Data range	0~1	Factory setting	0	Accessibility	RW	Related models	-	Map	NO

Subindex 08h	Name	Multiturn absolute encoder zero point single-turn offset				Data structure	-	Data type	Uint32
	Data range	0~8388607	Factory setting	0	Accessibility	RW	Related models	-	Map	NO

Subindex 09h	Name	Multiturn absolute encoder zero point multiturn offset				Data structure	-	Data type	Int32
	Data range	-32768~32767	Factory setting	0	Accessibility	RW	Related models	-	Map	NO

Subindex 0Ah	Name	Prohibit the encoder position to update the current position command				Data structure	-	Data type	Uint16
	Data range	0~1	Factory setting	0	Accessibility	RW	Related models	-	Map	NO

6.3.4 Basic control parameters

Index 2003h	Name	Basic control parameters				Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	ALL	Map	NO

Subindex 00h	Name	Maximum subindex number				Data structure	-	Data type	Uint8
	Data range	-	Factory setting	16	Accessibility	RO	Related models	-	Map	NO

Subindex 01h	Name	Control mode				Data structure	-	Data type	Uint16
	Data range	0～7	Factory setting	3	Accessibility	RW	Related models	ALL	Map	NO

Set the drive control mode:
0: Position control mode
1: Speed control mode
2: Torque control mode
3: EtherCAT control mode
4: Speed mode - Torque mode (reserved)
5: Position Mode - Speed Mode (reserved)
6: Position mode - Torque mode (reserved)
7: Position mode - Speed mode - Torque mode (reserved)

Subindex 02h	Name	Operation direction selection				Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	0	Accessibility	RW	Related models	ALL	Map	NO

Set the positive direction of the motor:
0: Regard the CCW direction as the forward rotation direction (when the forward direction is commanded, from the side of the motor shaft, the motor rotation direction is the CCW direction, that is, counterclockwise rotation)
1: Regard the CW direction as the forward rotation direction (when the forward direction is commanded, from the side of the motor shaft, the motor rotation direction is the CW direction, that is, clockwise rotation)

Subindex 03h	Name	Minimum value of braking resistance allowed for the drive (unit: Ω)				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 04h	Name	Built-in braking resistor power (unit: W)				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 05h	Name	Built-in braking resistor resistance value (unit: Ω)				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 06h	Name	Brake resistor heat dissipation coefficient (unit: %)				Data structure	-	Data type	Uint16
	Data range	0～100	Factory setting	20	Accessibility	RW	Related models	-	Map	NO

Subindex 07h	Name	Braking resistor setting				Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	0	Accessibility	RW	Related models	-	Map	NO

0: Use built-in resistor
1: Use external resistor

Subindex 08h	Name	External braking resistor power (unit: W)				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	50	Accessibility	RW	Related models	-	Map	NO

Subindex 09h	Name	External braking resistor resistance value (unit: Ω)				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	10	Accessibility	RW	Related models	-	Map	NO

Subindex 0Ah	Name	Braking start voltage threshold (unit: V)				Data structure	-	Data type	Uint16
	Data range	150～390	Factory setting	75	Accessibility	RW	Related models	-	Map	NO

Subindex 0Bh	Name	Disable brake feedback detection mode				Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	1	Accessibility	RW	Related models	-	Map	NO

Subindex 0Ch	Name	Maximum continuous braking time (unit: ms)				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	3000	Accessibility	RW	Related models	-	Map	NO

Subindex	Name	Reserve				Data structure	-	Data type	Uint16

ex 0Dh	Data range	-	Factory setting	-	Accessib ility	RO	Related models	-	Map	NO

Subind ex 0Eh	Name	Reserve					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessib ility	RO	Related models	-	Map	NO

Subind ex 0Fh	Name	The delay time from when the brake output is OFF to when the motor is not energized (unit: ms)					Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	50	Accessib ility	RW	Related models	-	Map	NO

Subind ex 10h	Name	Reserve					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessib ility	RO	Related models	-	Map	NO

6.3.5 Input terminal parameters

Index 2004h	Name	Input terminal parameters					Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessib ility		Related models	-	Map	YES

Subind ex 00h	Name	Maximum subindex number					Data structure	-	Data type	Uint8
	Data range	-	Factory setting	16	Accessib ility	RO	Related models	-	Map	NO

Subind ex 01h	Name	IN1 terminal function selection					Data structure	-	Data type	Uint16
	Data range	0～31	Factory setting	5	Accessib ility	RW	Related models	-	Map	YES

Set the function of the digital input terminal 1 of the drive.

Set value	IN terminal function	Set value	IN terminal function
0	FunIN.0: Normal input	16	FunIN.16: Multi-segment run command switching 3
1	FunIN.1: Servo enable	17	FunIN.17: Multi-segment run command switching4
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: Back to home input
7	FunIN. 7: Gain switching	23	FunIN. 23: Home switch signal
8	FunIN. 8: Electronic gear ratio switching	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 run command switching 1	30	FunIN.30: Probe 1
15	FunIN.15: Multi-segment run command switching 2	31	FunIN. 31: Probe 2

Subind ex 02h	Name	IN1 terminal logic selection					Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	0	Accessib ility	RW	Related models	-	Map	YES

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

Subindex 03h	Name	IN2 terminal function selection				Data structure	-	Data type	Uint16
	Data range	0～31	Factory setting	6	Accessibility	RW	Related models	-	Map	YES

Subindex 04h	Name	IN2 terminal logic selection				Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 05h	Name	IN3 terminal function selection				Data structure	-	Data type	Uint16
	Data range	0～31	Factory setting	23	Accessibility	RW	Related models	-	Map	YES

Subindex 06h	Name	IN3 terminal logic selection				Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 07h	Name	IN4 terminal function selection				Data structure	-	Data type	Uint16
	Data range	0～31	Factory setting	30	Accessibility	RW	Related models	-	Map	YES

Subindex 08h	Name	IN4 terminal logic selection				Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 09h	Name	IN5 terminal function selection				Data structure	-	Data type	Uint16
	Data range	0～31	Factory setting	6	Accessibility	RW	Related models	-	Map	YES

Subindex 0Ah	Name	IN5 terminal logic selection				Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	31	Accessibility	RW	Related models	-	Map	YES

Subindex 0Bh	Name	IN6 terminal function selection				Data structure	-	Data type	Uint16
	Data range	0～31	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 0Ch	Name	IN6 terminal logic selection				Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 0Dh	Name	IN7 terminal function selection				Data structure	-	Data type	Uint16
	Data range	0～31	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 0Eh	Name	IN7 terminal logic selection				Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 0Fh	Name	IN8 terminal function selection				Data structure	-	Data type	Uint16
	Data range	0～31	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 10h	Name	IN8 terminal logic selection				Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

6.3.6 Output terminal parameters

Index 2005h	Name	Output terminal parameters					Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	-	Map	YES

Subindex 00h	Name	Maximum subindex number					Data structure	-	Data type	Uint8
	Data range	-	Factory setting	8	Accessibility	RO	Related models	-	Map	NO

Subindex 01h	Name	OUT1 terminal function selection					Data structure	-	Data type	Uint16
	Data range	0~31	Factory setting	1	Accessibility	RW	Related models	-	Map	YES

Set the OUT function corresponding to the hardware OUT1 terminal. Please refer to the table below for parameter value setting.

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

Subindex 02h	Name	OUT1 terminal logic selection					Data structure	-	Data type	Uint16
	Data range	0~1	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

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 OUT function is valid	Transistor status
0	Low level	ON
1	High level	OFF

Subindex 03h	Name	OUT2 terminal function selection					Data structure	-	Data type	Uint16
	Data range	0~31	Factory setting	6	Accessibility	RW	Related models	-	Map	YES

Subindex 04h	Name	OUT2 terminal logic selection					Data structure	-	Data type	Uint16
	Data range	0~1	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 05h	Name	OUT3 terminal function selection					Data structure	-	Data type	Uint16
	Data range	0~31	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 06h	Name	OUT3 terminal logic selection					Data structure	-	Data type	Uint16
	Data range	0~1	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 07h	Name	OUT4 terminal function selection					Data structure	-	Data type	Uint16
	Data range	0~31	Factory setting	31	Accessibility	RW	Related models	-	Map	YES

Subindex 08h	Name	OUT4 terminal logic selection					Data structure	-	Data type	Uint16
	Data range	0~1	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

6.3.7 Position control parameters

Index 2006h	Name	Position control parameters					Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	-	Map	YES

Subindex 00h	Name	Maximum subindex number					Data structure	-	Data type	Uint8
	Data range	-	Factory setting	8	Accessibility	RO	Related models	-	Map	NO

Subindex 01h	Name	Position command clear setting					Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Set the clear operation mode of the position command counter when the motor is not enabled:
0: Position command is cleared
1: Position command is not cleared

Subindex 02h	Name	Reserve					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 03h	Name	Reserve					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 04h	Name	Reserve					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 05h	Name	Reserve					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 06h	Name	Reserve					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 07h	Name	Positioning completion threshold unit setting					Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	0	Accessibility	RW	Related models	-	Map	NO

Set the unit of positioning completion threshold
0: Command unit
1: Encoder unit

Subindex 08h	Name	-					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

6.3.8 Speed control parameters

Index 2007h	Name	Speed control parameters					Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	-	Map	YES

Subindex 00h	Name	Maximum subindex number					Data structure	-	Data type	Uint8
	Data range	-	Factory setting	3	Accessibility	RO	Related models	-	Map	NO

Subindex 01h	Name	Jog speed (unit: rpm)					Data structure	-	Data type	Uint16
	Data range	0～3000	Factory setting	100	Accessibility	RW	Related models	-	Map	YES

Subindex 02h	Name	Reserve					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	0	Accessibility	RO	Related models	-	Map	NO

Subindex 03h	Name	Reserve				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	10	Accessibility	RO	Related models	-	Map	NO

6.3.9 Torque control parameters

Index 2008h	Name	Torque control parameters				Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	-	Map	YES

Subindex 00h	Name	Maximum subindex number				Data structure	-	Data type	Uint8
	Data range	-	Factory setting	13	Accessibility	RO	Related models	-	Map	NO

Subindex 01h	Name	Torque command filtering time constant (unit: 0.01ms)				Data structure	-	Data type	Uint16
	Data range	0～3000	Factory setting	1000	Accessibility	RW	Related models	-	Map	YES

Subindex 02h	Name	Second torque command filtering time constant (unit: 0.01ms)				Data structure	-	Data type	Uint16
	Data range	0～3000	Factory setting	1000	Accessibility	RW	Related models	-	Map	YES

Subindex 03h	Name	Reserve				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	0	Accessibility	RO	Related models	-	Map	NO

Subindex 04h	Name	Reserve				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	3000	Accessibility	RO	Related models	-	Map	NO

Subindex 05h	Name	Reserve				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	3000	Accessibility	RO	Related models	-	Map	NO

Subindex 06h	Name	Reserve				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	10	Accessibility	RO	Related models	-	Map	NO

Subindex 07h	Name	Reserve				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	0	Accessibility	RO	Related models	-	Map	NO

Subindex 08h	Name	Reserve				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	3000	Accessibility	RO	Related models	-	Map	NO

Subindex 09h	Name	Reserve				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	3000	Accessibility	RO	Related models	-	Map	NO

Subindex 0Ah	Name	Torque reaches the reference value (unit: 0.1%)				Data structure	-	Data type	Uint16
	Data range	0～3000	Factory setting	0	Accessibility	RO	Related models	PT/CST	Map	NO

Subindex 0Bh	Name	Torque reaches the effective value (unit: 0.1%)				Data structure	-	Data type	Uint16
	Data range	0～3000	Factory setting	0	Accessibility	RW	Related models	PT/CST	Map	NO

Subindex 0Ch	Name	Torque reaches the invalid value (unit: 0.1%)				Data structure	-	Data type	Uint16
	Data range	0～3000	Factory setting	0	Accessibility	RW	Related models	PT/CST	Map	NO

Subind	Name	Reserve				Data structure	-	Data type	Uint16

ex 0Dh	Data range	-	Factory setting	50	Accessibility	RW	Related models	-	Map	NO

6.3.10 Gain parameters

Index 2009h	Name	Gain parameters					Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	-	Map	YES

Subindex 00h	Name	Maximum subindex number					Data structure	-	Data type	Uint8
	Data range	-	Factory setting	22	Accessibility	RO	Related models	-	Map	NO

Subindex 01h	Name	1st speed proportional gain					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	5000	Accessibility	RW	Related models	-	Map	YES

Subindex 02h	Name	1st velocity integration time constant					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	2000	Accessibility	RW	Related models	-	Map	YES

Subindex 03h	Name	1st position proportional gain					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	600	Accessibility	RW	Related models	-	Map	YES

Subindex 04h	Name	2nd speed proportional gain					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	9000	Accessibility	RW	Related models	-	Map	YES

Subindex 05h	Name	2nd velocity integration time constant					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	3500	Accessibility	RW	Related models	-	Map	YES

Subindex 06h	Name	2nd position proportional gain					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	800	Accessibility	RW	Related models	-	Map	YES

Subindex 07h	Name	Speed Kd					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 08h	Name	Speed Kr					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	1000	Accessibility	RW	Related models	-	Map	YES

Subindex 09h	Name	Speed Km					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 0Ah	Name	Load inertia ratio (unit: %)					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	100	Accessibility	RW	Related models	-	Map	YES

Subindex 0Bh	Name	Speed feedforward filtering time constant					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	2000	Accessibility	RW	Related models	-	Map	YES

Subindex 0Ch	Name	Speed feedforward gain					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 0Dh	Name	Torque feedforward filtering time constant					Data structure	-	Data type	Uint16
	Data range	0~65535	Factory setting	2000	Accessibility	RW	Related models	-	Map	YES

Subindex 0Eh	Name	Torque feedforward gain				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	0	Accessibility	RW	Related models	-	Map	YES

Subindex 0Fh	Name	Speed feedback filtering time constant				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	1000	Accessibility	RW	Related models	-	Map	YES

Subindex 10h	Name	Speed feedback low-pass filter cut-off frequency 1				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	1000	Accessibility	RW	Related models	-	Map	YES

Subindex 11h	Name	Speed feedback low-pass filter cut-off frequency 2				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	2000	Accessibility	RW	Related models	-	Map	YES

Subindex 12h	Name	Reserve				Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 13h	Name	Torque given filtering time constant				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	3000	Accessibility	RW	Related models	-	Map	YES

Subindex 14h	Name	Torque feedback filtering time constant				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	3000	Accessibility	RW	Related models	-	Map	YES

Subindex 15h	Name	Current loop proportional gain				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	800	Accessibility	RW	Related models	-	Map	YES

Subindex 16h	Name	Current loop integration time constant				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	1500	Accessibility	RW	Related models	-	Map	YES

6.3.11 Self-tuning parameters

Index 200Ah	Name	Self-tuning parameters				Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	-	Map	YES

Subindex 00h	Name	Maximum subindex number				Data structure	-	Data type	Uint8
	Data range	-	Factory setting	10	Accessibility	RO	Related models	-	Map	NO

Subindex 01h	Name	Adaptive notch filter mode selection				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	5000	Accessibility	RW	Related models	-	Map	YES

Subindex 02h	Name	The first group of notch filter frequency				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	1024	Accessibility	RW	Related models	-	Map	YES

Subindex 03h	Name	The first group of notch filter width level				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	128	Accessibility	RW	Related models	-	Map	YES

Subindex 04h	Name	The first group of notch filter depth level				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	5000	Accessibility	RW	Related models	-	Map	YES

Subindex 05h	Name	The second group of notch filter frequency				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	1024	Accessibility	RW	Related models	-	Map	YES

Subindex 06h	Name	The second group of notch filter width level				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	128	Accessibility	RW	Related models	-	Map	YES

Subindex 07h	Name	The second group of notch filter depth level				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	5000	Accessibility	RW	Related models	-	Map	YES

Subindex 08h	Name	The third group of notch filter frequency				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	1024	Accessibility	RW	Related models	-	Map	YES

Subindex 09h	Name	The third group of notch filter width level				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	128	Accessibility	RW	Related models	-	Map	YES

Subindex 0Ah	Name	The third group of notch filter depth level				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	5000	Accessibility	RW	Related models	-	Map	YES

Subindex 0Bh	Name	The fourth group of notch filter frequency				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	1024	Accessibility	RW	Related models	-	Map	YES

Subindex 0Ch	Name	The fourth group of notch filter width level				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	128	Accessibility	RW	Related models	-	Map	YES

Subindex 0Dh	Name	The fourth group of notch filter width level				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	5000	Accessibility	RW	Related models	-	Map	YES

Subindex 0Eh	Name	Resonance frequency identification result				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	1024	Accessibility	RW	Related models	-	Map	YES

Subindex 0Fh	Name	Torque disturbance compensation gain				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	128	Accessibility	RW	Related models	-	Map	YES

Subindex 10h	Name	Torque disturbance observer filter time constant				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	128	Accessibility	RW	Related models	-	Map	YES

Subindex 11h	Name	Low frequency resonance frequency				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	100	Accessibility	RW	Related models	-	Map	YES

Subindex 12h	Name	Low frequency resonance frequency filter setting				Data structure	-	Data type	Uint16
	Data range	0～65535	Factory setting	1000	Accessibility	RW	Related models	-	Map	YES

6.3.12 Fault parameters

Index 200Bh	Name	Fault parameters				Data structure	ARR	Data type	Uint16
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	-	Map	YES

Subindex 00h	Name	Maximum subindex number				Data structure	-	Data type	Uint8
	Data range	-	Factory setting	11	Accessibility	RO	Related models	-	Map	NO

Subindex 01h	Name	Historical fault record 0				Data structure	-	Data type	Uint16
	Data	-	Factory	-	Accessibility	RO	Related	-	Map	NO

	range		setting		ility		models			

Subindex 02h	Name	Historical fault record 1					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 03h	Name	Historical fault record 2					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 04h	Name	Historical fault record 3					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 05h	Name	Historical fault record 4					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 06h	Name	Historical fault record 5					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 07h	Name	Historical fault record 6					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 08h	Name	Historical fault record 7					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 09h	Name	Historical fault record 8					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 0Ah	Name	Historical fault record 9					Data structure	-	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	NO

Subindex 0Ah	Name	Clear historical fault records					Data structure	-	Data type	Uint16
	Data range	0～1	Factory setting	0	Accessibility	RW	Related models	-	Map	NO

6.4 Detailed description of sub-protocol definition parameters (group 6000h)

Index 603Fh	Name	Error code					Data structure	VAR	Data type	Uint16
	Data range	0x0000～0xFFFF	Factory setting	-	Accessibility	RO	Related models	ALL	Map	TPDO
When the drive has an error described in the DS402 sub-protocol, 603Fh is consistent with the DS402 protocol. The value of 603Fh is hexadecimal data										

Index 6040h	Name	Control word					Data structure	VAR	Data type	Uint16
	Data range	0x0000～0xFFFF	Factory setting	0	Accessibility	RW	Related models	ALL	Map	RPDO

Set control commands:

Bit	Name		Description
0	可以开启伺服运行	Switch on	0: invalid, 1: valid
1	接通主回路电	Enable voltage	0: invalid, 1: valid
2	快速停机	Quick stop	0: invalid, 1: valid
3	伺服运行	Enable operation	0: invalid, 1: valid
4～6	运行模式相关	Operation mode specific	Related to servo operation mode
7	故障复位	Fault reset	For resettable faults and warnings, perform fault reset function The rising edge of Bit7 is valid; Bit7 remains at 1, other control commands are invalid
8	暂停	Halt	Please check the object dictionary 605Dh for the pause mode in each mode
9	运行模式相关	Operation mode specific	Related to each servo operation mode
10	保留	Reverse	Undefined
11～15	厂家自定义	Manufacturer-specific	Manufacturer customization

◆ Note:

1)、It is meaningless to assign a value to each Bit of the control word separately, and it must form a control command without co-constructing with others;

2)、Bit0～Bit3 and Bit7 have the same meaning in each servo mode. Commands must be sent in order to guide the servo drive into the expected state according to the CiA402 state machine switching process. Each command corresponds to a certain state;

3)、Bit4～Bit6 are related to each servo mode, please check the control commands in different modes;

4)、Bit9 has no defined function.

Index 6041h	Name	Status word				Data structure	VAR	Data type	Uint16
	Data range	0x0000～0xFFFF	Factory setting	0	Accessibility	RO	Related models	ALL	Map	TPDO

Reflect the current running status of the servo drive:

Bit	Name		Description
0	伺服准备好	Ready to switch on	0: invalid, 1: valid
1	可以开启伺服运行	Switch on	0: invalid, 1: valid
2	伺服运行	Operation enabled	0: invalid, 1: valid
3	故障	Fault	0: invalid, 1: valid
4	主电路电接通	Voltage enabled	0: invalid, 1: valid
5	快速停机	Quick stop	0: invalid, 1: valid
6	伺服不可运行	Switch on disabled	0: invalid, 1: valid
7	警告	Warning	0: invalid, 1: valid
8	厂家自定义	Manufacturer specific	Undefined functions
9	远程控制	Remote	0: invalid, 1: valid (control word valid)
10	目标到达	Target reach	0: invalid, 1: valid
11	内部限制有效	Internal limit active	0: invalid, 1: valid
12～13	运行模式相关	Operation limit active	Related to each servo operation mode
14	厂家自定义	Manufacturer specific	Undefined functions
15	原点已找到	Home find	0: invalid, 1: valid

显示值(二进制数值)	Description
xxxx xxxx x0xx 0000	未准备好(Not ready to switch on)
xxxx xxxx x1xx 0000	启动失效(Switch on disabled)
xxxx xxxx x01x 0001	准备好(Ready to switch on)
xxxx xxxx x01x 0011	启动(Switch on)
xxxx xxxx x01x 0111	操作使能(Operation enabled)
xxxx xxxx x00x 0111	快速停机有效(Quick stop active)
xxxx xxxx x0xx 1111	故障反应有效(Fault reaction active)
xxxx xxxx x0xx 1000	故障(Fault)

◆ Note:

1)、Bit0～Bit9 have the same meaning in each servo mode. After the control word 6040h sends commands in order, the servo will feedback a certain state.

2)、Bit12～Bit13 are related to each servo mode (please check the control commands in different modes)

3)、Bit10, Bit11, and Bit15 have the same meaning in each servo mode, and feedback the status of the servo after executing a certain servo mode.

Index 605Ah	Name	Quick stop mode selection				Data structure	VAR	Data type	Int16
	Data range	0～6	Factory setting	2	Accessibility	RW	Related models	ALL	Map	NO

Index 605Bh	Name	Shutdown method selection				Data structure	VAR	Data type	Int16
	Data range	0～6	Factory setting	0	Accessibility	RW	Related models	ALL	Map	NO

Index 605Ch	Name	Enable failure mode selection				Data structure	VAR	Data type	Int16
	Data range	0～6	Factory setting	1	Accessibility	RW	Related models	ALL	Map	NO

Index 605Dh	Name	Pause shutdown method selection				Data structure	VAR	Data type	Int16
	Data range	1～3	Factory setting	1	Accessibility	RW	Related models	ALL	Map	NO

When selecting the servo driver to pause, the deceleration method of the servo motor from rotation to shutdown and the motor status after stopping.

PP/PV/HM mode:

Set value	Shutdown method
1	Stop at 6084h/609Ah (HM) ramp and keep the position locked
2	Stop at 6085 ramp and keep the position locked
3	Emergency stop torque shutdown, maintain position locked state

PT mode:

Set value	Shutdown method
1/2/3	Stop at 6087h ramp and keep the position locked

Index 605Eh	Name	Failure mode selection				Data structure	VAR	Data type	Int16
	Data range	0～6	Factory setting	1	Accessibility	RW	Related models	ALL	Map	NO

Index 6060h	Name	Mode selection				Data structure	VAR	Data type	Int8
	Data range	0～10	Factory setting	8	Accessibility	RW	Related models	ALL	Map	RPDO

Select the servo operation mode:

Set value	Servo mode	
0/2/5	NA	Reserve
1	轮廓位置模式(PP)	
3	轮廓速度模式(PV)	
4	轮廓转矩模式(PT)	
6	回零模式(HM)	
7	插补模式(IP)	
8	周期同步位置模式(CSP)	
9	周期同步速度模式(CSV)	
10	周期同步转矩模式(CST)	

Index 6061h	Name	Operation mode display				Data structure	VAR	Data type	Int8
	Data range	0～10	Factory setting	-	Accessibility	RO	Related models	ALL	Map	TPDO

Display the current operating mode of the servo drive:

Set value	Servo mode	
0/2/5	NA	Reserve
1	轮廓位置模式(PP)	
3	轮廓速度模式(PV)	
4	轮廓转矩模式(PT)	
6	回零模式(HM)	
7	插补模式(IP)	
8	周期同步位置模式(CSP)	
9	周期同步速度模式(CSV)	
10	周期同步转矩模式(CST)	

Index 6062h	Name	Position command (unit: command unit)				Data structure	VAR	Data type	Int32
	Data range	-	Factory setting	-	Accessibility	RW	Related models	PP/HM/CSP	Map	TPDO

Reflect the input position command (command unit) when the servo is enabled

Index 6063h	Name	Position feedback (unit: encoder unit)					Data structure	VAR	Data type	Int32
	Data range	-	Factory setting	-	Accessibility	RO	Related models	ALL	Map	TPDO

Index 6064h	Name	Position feedback (unit: command unit)					Data structure	VAR	Data type	Int32
	Data range	-	Factory setting	-	Accessibility	RO	Related models	ALL	Map	TPDO

Reflect real-time user absolute position feedback: position feedback 6064h x gear ratio 6091h = position feedback 6063h

Index 6065h	Name	Threshold for excessive position deviation (unit: command unit)					Data structure	VAR	Data type	Uint32
	Data range	$0\sim(2^{32}-1)$	Factory setting	Determined by model	Accessibility	RW	Related models	PP/HM/CSP	Map	RPDO

Set the threshold for excessive position deviation, when the absolute value of the position deviation (command unit) exceeds 6065h, AL.240 (excessive position deviation fault) will occur.
Note: When the set value of 6065h is 0xFFFFFFFF, the servo will not monitor the excessive position deviation, please use this function with caution.
Note: The saving of this parameter needs to write 1 to P12.20 through the USB serial port or the host computer debugging software to save it when the motor is not enabled.

Index 6067h	Name	Position reaches threshold					Data structure	VAR	Data type	Uint32
	Data range	$0\sim(2^{32}-1)$	Factory setting	92	Accessibility	RW	Related models	PP/HM/CSP	Map	RPDO

When setting the threshold of position reaching, the unit of 6067h can be set through 2006-07h, and the default is the command unit.
When the absolute value of the position deviation is within 6067h and the duration reaches 6068h, the position arrival is considered valid. In PP/HM/CSP mode, Bit10 of the status word 6041=1
In PP/HM/CSP mode, when the servo is enabled, this flag is meaningful, otherwise it is meaningless

Index 6068h	Name	Position arrival time window (unit: ms)					Data structure	VAR	Data type	Uint16
	Data range	$0\sim(2^{16}-1)$	Factory setting	10	Accessibility	RW	Related models	PP/HM/CSP	Map	RPDO

Set the time window for judging the position to arrive valid
The absolute value of the difference between the user position command 6062h and the user actual position feedback 6064h or the internal position command 60FCh and the position feedback 6063h is within 6067h, and the time reaches 6068h, the position is considered to be reached, the status word 6041h Bit10=1, servo enable is invalid, this flag is meaningless

Index 606Ch	Name	Speed feedback (unit: command unit/s)					Data structure	VAR	Data type	Int32
	Data range	-	Factory setting	-	Accessibility	RO	Related models	ALL	Map	TPDO

Index 606Dh	Name	Speed reaches threshold (unit: rpm)					Data structure	VAR	Data type	Uint16
	Data range	$0\sim(2^{16}-1)$	Factory setting	10	Accessibility	RW	Related models	PV/CSV	Map	RPDO

Set the threshold for reaching the speed.
When the absolute value of the difference between the target speed 60FFh (when converted into motor speed in rpm unit)and the actual motor speed is within 606Dh, and the time reaches 606Eh, the speed is considered to be reached, the Bit10 of the status word 6041 is 1, and the speed reaches the OUT function signal output is valid

Index 606Eh	Name	Speed arrival time window (unit: ms)					Data structure	VAR	Data type	Uint16
	Data range	$0\sim(2^{16}-1)$	Factory setting	10	Accessibility	RW	Related models	PV/CSV	Map	RPDO

Index 6071h	Name	Target torque (unit: 0.1%)					Data structure	VAR	Data type	Int16
	Data range	-3000~3000	Factory setting	0	Accessibility	RW	Related models	PT/CST	Map	RPDO

Set the servo target torque in contour torque mode (PT) and periodic synchronous torque mode (CST). 100.0% corresponds to 1 times the rated torque of the motor.

Index 6072h	Name	Maximum torque (unit: 0.1%)					Data structure	VAR	Data type	Uint16
	Data range	0~3000	Factory setting	3000	Accessibility	RW	Related models	ALL	Map	RPDO

Set the maximum torque allowable value of the servo. 100.0% corresponds to 1 times the rated torque of the motor.

Index 6074h	Name	Target torque (unit: 0.1%)					Data structure	VAR	Data type	Int16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	ALL	Map	TPDO

Display the current value of the servo internal torque command in the servo running state. 100.0% corresponds to 1 times the rated torque of the motor.

Index 6077h	Name	Torque feedback (unit: 0.1%)					Data structure	VAR	Data type	Int16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	ALL	Map	TPDO

Display the internal torque feedback of the servo. 100.0% corresponds to 1 times the rated torque of the motor.

Index 607Ah	Name	Target position (unit: command unit)				Data structure	VAR	Data type	Int32
	Data range	$-2^{31}\sim(2^{31}-1)$	Factory setting	0	Accessibility	RW	Related models	PP/CSP	Map	RPDO

Set the servo target position in profile position mode (PP) and cycle synchronous position mode (CSP).

Index 607Ch	Name	Origin offset				Data structure	VAR	Data type	Int32
	Data range	$-2^{31}\sim(2^{31}-1)$	Factory setting	0	Accessibility	RW	Related models	HM	Map	RPDO

Set the physical position where the mechanical zero point deviates from the motor origin under zero return.
Origin offset valid condition: this time power-on operation, the origin return operation has been completed, Bit15 of status word 6041h = 1

Index 607Dh	Name	Software absolute position limit				Data structure	ARR	Data type	-
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	-	Map	YES

Set the minimum and maximum values of the absolute position limit of the software
Minimum software absolute position limit = 607D-01h
Maximum software absolute position limit = 607D-02h

Subindex 00h	Name	Maximum Subindex number restricted by software absolute position				Data structure	VAR	Data type	Uint8
	Data range	-	Factory setting	2	Accessibility	RO	Related models	-	Map	NO
Subindex 01h	Name	Minimum software absolute position limit (unit: command unit)				Data structure	VAR	Data type	Int32
	Data range	$-2^{31}\sim(2^{31}-1)$	Factory setting	0	Accessibility	RW	Related models	ALL	Map	RPDO

Set the minimum software absolute position limit, which refers to the absolute position relative to the mechanical zero point.

Subindex 02h	Name	Maximum software absolute position limit (unit: command unit)				Data structure	VAR	Data type	Int32
	Data range	$-2^{31}\sim(2^{31}-1)$	Factory setting	0	Accessibility	RW	Related models	ALL	Map	RPDO

Set the maximum software absolute position limit, which refers to the position relative to the mechanical zero point.

Index 607Fh	Name	Maximum profile speed (unit: command unit/s)				Data structure	VAR	Data type	Uint32
	Data range	$0\sim(2^{31}-1)$	Factory setting	10000	Accessibility	RW	Related models	ALL	Map	RPDO

Index 6081h	Name	Profile speed (unit: command unit/s)				Data structure	VAR	Data type	Uint32
	Data range	$0\sim(2^{31}-1)$	Factory setting	10000	Accessibility	RW	Related models	PP	Map	RPDO

Set the uniform running speed of the displacement command in the profile position mode.

Index 6083h	Name	Profile acceleration (unit: command unit/s2)				Data structure	VAR	Data type	Uint32
	Data range	$0\sim(2^{31}-1)$	Factory setting	100000	Accessibility	RW	Related models	PP/PV	Map	RPDO

Set the acceleration in profile position mode and profile velocity mode.

Index 6084h	Name	Profile deceleration (unit: command unit/s2)				Data structure	VAR	Data type	Uint32
	Data range	$0\sim(2^{31}-1)$	Factory setting	100000	Accessibility	RW	Related models	PP/PV/CSP/CSV	Map	RPDO

Set the deceleration in profile position mode and profile speed mode.

Index 6085h	Name	Quick stop deceleration (unit: command unit/s2)				Data structure	VAR	Data type	Uint32
	Data range	$0\sim(2^{31}-1)$	Factory setting	500000	Accessibility	RW	Related models	PP/PV/CSP/CSV/HM	Map	RPDO

Index 6087h	Name	Torque ramp (unit: 0.1%/s)				Data structure	VAR	Data type	Uint32
	Data range	$0\sim(2^{31}-1)$	Factory setting	3000	Accessibility	RW	Related models	PT/CST	Map	RPDO

Set the torque command acceleration in contour torque mode, and its meaning is: torque command increment per second.

Index 6091h	Name	Gear ratio				Data structure	ARR	Data type	-
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	PP/PV/CSP/CSV/HM	Map	YES

The gear ratio is used to establish the proportional relationship between the displacement of the load shaft specified by the user and the displacement of the motor shaft.

1)、The relationship between motor feedback position (encoder unit) and load shaft position feedback (command unit):

$$motor\ feedback\ position = load\ shaft\ position\ feedback \times gear\ ratio$$

2)、The relationship between motor speed (rpm) and load shaft speed (command unit/s):

$$motor\ speed\ (rpm) = \frac{load\ shaft\ speed \times gear\ ratio}{encoder\ resolution} \times 60$$

3)、The relationship between motor acceleration (rpm/ms) and load shaft acceleration (command unit/s2):

$$motor\ acceleration = \frac{load\ shaft\ accelerarion \times gear\ ratio}{encoder\ resolution} \times \frac{1000}{60}$$

Subindex 00h	Name	Maximum subindex number of the gear ratio				Data structure	-	Data type	Uint8
	Data range	-	Factory setting	2	Accessibility	RO	Related models	-	Map	NO
Subindex 01h	Name	Gear ratio numerator				Data structure	VAR	Data type	Uint32
	Data range	1～(2^{31}-1)	Factory setting	1	Accessibility	RW	Related models	-	Map	RPDO
Subindex 02h	Name	Gear ratio denominator				Data structure	VAR	Data type	Uint32
	Data range	1～(2^{31}-1)	Factory setting	1	Accessibility	RW	Related models	-	Map	RPDO

Index 6098h	Name	Method of homing				Data structure	VAR	Data type	Int8
	Data range	0～35	Factory setting	17	Accessibility	RW	Related models	HM	Map	RPDO

Select the method of homing:

Set value	Description
17	Return to zero in the reverse direction, the deceleration point is the reverse limit switch, and the origin is the reverse limit switch
18	Return to zero in the positive direction, the deceleration point is the positive limit switch, the origin is the positive limit switch
19	Return to zero in the positive direction, the deceleration point is the origin switch, and the origin is the origin switch
20	Return to zero in the positive direction, the deceleration point is the origin switch, and the origin is the origin switch
21	Return to zero in the reverse direction, the deceleration point is the origin switch, and the origin is the origin switch
22	Return to zero in the reverse direction, the deceleration point is the origin switch, and the origin is the origin switch
23	Return to zero in the positive direction, the deceleration point is the origin switch, and the origin is the origin switch
24	Return to zero in the positive direction, the deceleration point is the origin switch, and the origin is the origin switch
25	Return to zero in the positive direction, the deceleration point is the origin switch, and the origin is the origin switch
26	Return to zero in the positive direction, the deceleration point is the origin switch, and the origin is the origin switch
27	Return to zero in the reverse direction, the deceleration point is the origin switch, and the origin is the origin switch
28	Return to zero in the reverse direction, the deceleration point is the origin switch, and the origin is the origin switch
29	Return to zero in the reverse direction, the deceleration point is the origin switch, and the origin is the origin switch
30	Return to zero in the reverse direction, the deceleration point is the origin switch, and the origin is the origin switch
35	Take the current position as the origin

Index 6099h	Name	Speed of homing				Data structure	ARR	Data type	-
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	HM	Map	YES
Subindex 00h	Name	Maximum subindex number for speed of homing				Data structure	-	Data type	Uint8
	Data range	-	Factory setting	2	Accessibility	RO	Related models	-	Map	NO
Subindex 01h	Name	Search deceleration point signal speed (unit: command unit/s)				Data structure	VAR	Data type	Uint32
	Data range	0～(2^{31}-1)	Factory setting	10000	Accessibility	RW	Related models	HM	Map	RPDO
Subindex 02h	Name	Search origin signal speed (unit: command unit/s)				Data structure	VAR	Data type	Uint32
	Data range	0～(2^{31}-1)	Factory setting	2000	Accessibility	RW	Related models	HM	Map	RPDO

Index 609Ah	Name	Home acceleration (unit: command unit/s2)				Data structure	VAR	Data type	Uint32
	Data range	0～(2³¹-1)	Factory setting	100000	Accessibility	RW	Related models	HM	Map	RPDO

Index 60B0h	Name	Position offset (unit: command unit)				Data structure	VAR	Data type	Int32
	Data range	-2³¹～(2³¹-1)	Factory setting	0	Accessibility	RW	Related models	CSP	Map	RPDO

Set the servo position command offset in the cyclic synchronous position mode. After the offset: Servo target position = 607Ah + 60B0h

Index 60B1h	Name	Speed offset (unit: command unit)				Data structure	VAR	Data type	Int32
	Data range	-2³¹～(2³¹-1)	Factory setting	0	Accessibility	RW	Related models	CSP/CSV	Map	RPDO

Set the servo speed command offset in the periodic synchronous speed mode. After the offset: Servo target speed = 60FFh + 60B1h

Index 60B2h	Name	Torque offset (unit: 0.1%)				Data structure	VAR	Data type	Int16
	Data range	-3000～3000	Factory setting	0	Accessibility	RW	Related models	CSP/CSV/ CST	Map	RPDO

Set the servo torque command offset in the cyclic synchronous torque mode. After the offset: Servo target torque = 6071h + 60B2h

Index 60B8h	Name	Probe function				Data structure	VAR	Data type	Uint16
	Data range	0～(2¹⁶-1)	Factory setting	0	Accessibility	RW	Related models	-	Map	RPDO

Setting the function of probe 1 and probe 2

Bit	Description	Setting
0	Probe 1 enable	0: Probe 1 is not enabled 1: Probe 1 enabled
1	Probe 1 trigger mode	0: Single trigger, trigger only when the trigger signal is valid for the first time 1: Continuous trigger
2	Probe 1 trigger signal selection	0: IN input signal 1: Meaningless
3	NA	Meaningless
4	Probe 1 rising edge enable	0: The rising edge is not latched 1: Rising edge latch
5	Probe 1 falling edge enable	0: The falling edge is not latched 1: Falling edge latch
6	NA	Meaningless
7	NA	Meaningless
8	Probe 2 enable	0: Probe 2 is not enabled 1: Probe 2 enabled
9	Probe 2 trigger mode	0: Single trigger, trigger only when the trigger signal is valid for the first time 1: Continuous trigger
10	Probe 2 trigger signal selection	0: IN input signal 1: Meaningless
11	NA	Meaningless
12	Probe 2 rising edge enable	0: The rising edge is not latched 1: Rising edge latch
13	Probe 2 falling edge enable	0: The falling edge is not latched 1: Falling edge latch
14	NA	Meaningless
15	NA	Meaningless

Index 60B9h	Name	Probe status				Data structure	VAR	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	TPDO

Read the status of probe 1 and probe 2

Bit	Description	Remarks
0	Probe 1 enable	0: Probe 1 is not enabled 1: Probe 1 enabled
1	Probe 1 rising edge latch execution	0: The rising edge latch is not executed 1: The rising edge latch has been executed
2	Probe 1 falling edge latch execution	0: The falling edge latch is not executed 1: The falling edge latch has been executed
3～6	NA	Meaningless
7	Probe 1 trigger signal monitoring	0: IN is low level 1: IN is high level
8	Probe 2 enable	0: Probe 2 is not enabled 1: Probe 2 enabled

9	Probe 2 rising edge latch execution	0: The rising edge latch is not executed 1: The rising edge latch has been executed
10	Probe 2 falling edge latch execution	0: The falling edge latch is not executed 1: The falling edge latch has been executed
11~14	NA	Meaningless
15	0: IN is low level 1: IN is high level	Meaningless

Index 60BAh	Name	Probe 1 rising edge position feedback (unit: command unit)				Data structure	VAR	Data type	Int32
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	TPDO

Index 60BBh	Name	Probe 1 falling edge position feedback (unit: command unit)				Data structure	VAR	Data type	Int32
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	TPDO

Index 60BCh	Name	Probe 2 rising edge position feedback (unit: command unit)				Data structure	VAR	Data type	Int32
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	TPDO

Index 60BDh	Name	Probe 2 falling edge position feedback (unit: command unit)				Data structure	VAR	Data type	Int32
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	TPDO

Index 60D5h	Name	Probe 1 rising edge count				Data structure	VAR	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	TPDO

Index 60D6h	Name	Probe 1 falling edge count				Data structure	VAR	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	TPDO

Index 60D7h	Name	Probe 2 rising edge count				Data structure	VAR	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	TPDO

Index 60D8h	Name	Probe 2 falling edge count				Data structure	VAR	Data type	Uint16
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	TPDO

Index 60E0h	Name	Maximum forward torque limit (unit: 0.1%)				Data structure	VAR	Data type	Uint16
	Data range	0~3000	Factory setting	3000	Accessibility	RW	Related models	ALL	Map	RPDO

Index 60E1h	Name	Maximum negative torque limit (unit: 0.1%)				Data structure	VAR	Data type	Uint16
	Data range	0~3000	Factory setting	3000	Accessibility	RW	Related models	ALL	Map	RPDO

Index 60F4h	Name	Position deviation (unit: command unit)				Data structure	VAR	Data type	Int32
	Data range	-	Factory setting	-	Accessibility	RO	Related models	PP/HM/CSP	Map	TPDO

Index 60FCh	Name	Position command (unit: encoder unit)				Data structure	VAR	Data type	Int32
	Data range	-	Factory setting	-	Accessibility	RO	Related models	PP/HM/CSP	Map	TPDO

Index 60FDh	Name	Digital input				Data structure	VAR	Data type	Uint32
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	TPDO

Reflect the current IN terminal logic of the drive: 0-logic invalid, 1-logic valid

Bit	Description
0	Positive limit switch
1	Reverse limit switch
2	Origin switch
3～15	NA
16	IN1
17	IN2
18	IN3
19	IN4
20	IN5
21	IN6
22	IN7
23	IN8
24	IN9
25～31	NA

Index 60FEh	Name	Digital output					Data structure	ARR	Data type	-
	Data range	OD Data range	Factory setting	OD default value	Accessibility	-	Related models	-	Map	YES
Subindex 00h	Name	Maximum subindex number for digital output					Data structure	-	Data type	Uint8
	Data range	-	Factory setting	2	Accessibility	RO	Related models	-	Map	NO
Subindex 01h	Name	Physical output					Data structure	VAR	Data type	Uint32
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	RPDO

Reflect the output logic of the OUT port of the drive

Bit	Related OUT ports	Description
0～15	NA	NA
16	OUT1	Forced output (0: OFF, 1: ON), only valid when Bit 16 of 60FE-02h is set to 1
17	OUT2	Forced output (0: OFF, 1: ON), only valid when Bit 17 of 60FE-02h is set to 1
18	OUT3	Forced output (0: OFF, 1: ON), only valid when Bit 18 of 60FE-02h is set to 1
19	OUT4	Forced output (0: OFF, 1: ON), only valid when Bit 19 of 60FE-02h is set to 1
20～31	NA	NA

Note:
The function setting value of the OUT port must be set to 31 (general output) to be controlled by 60FE-1h and 60FE-2h.

Subindex 02h	Name	Physical output enable					Data structure	VAR	Data type	Uint32
	Data range	-	Factory setting	-	Accessibility	RO	Related models	-	Map	RPDO

Set whether to enable OUT forced output:

Bit	Related OUT ports	Description
0～15	NA	NA
16	OUT1	0: Disable OUT1 forced output 1: Enables OUT1 forced output
17	OUT2	0: Disable OUT2 forced output 1: Enables OUT2 forced output
18	OUT3	0: Disable OUT3 forced output 1: Enables OUT3 forced output
19	OUT4	0: Disable OUT4 forced output 1: Enables OUT4 forced output
20～31	NA	NA

Index 60FFh	Name	Target speed (unit: command unit/s)					Data structure	VAR	Data type	Int32
	Data range	-2^{31}～$(2^{31}-1)$	Factory setting	0	Accessibility	RW	Related models	PV/CSV	Map	RPDO

设置轮廓速度模式及周期同步速度模式下，用户速度指令。

Index 60FFh	Name	Supports servo operation mode				Data structure	VAR	Data type	Uint32
	Data range	-	Factory setting	941	Accessibility	RO	Related models	-	Map	NO

Reflects the servo operation mode supported by the drive.

Bit	Description	Supported or not (0: not supported, 1: supported)
0	轮廓位置模式(PP)	1
1	变频调速模式(VL)	0
2	轮廓速度模式(PV)	1
3	轮廓转矩模式(PT)	1
4	NA	0
5	回零模式(HM)	1
6	插补模式(IP)	0
7	周期同步位置模式(CSP)	1
8	周期同步速度模式(CSV)	1
9	周期同步转矩模式(CST)	1
10～31	NA	0

Chapter 7 Troubleshooting

7.1 **List of faults**

LED status	Description
🟢	Green light on constantly: drive not enabled
🟢🟢	Green light flashes: the drive is enabled, in normal working condition
🟢🔴	1 green, 1 red: drive overcurrent
🟢🔴🔴	1 green, 2 red: drive overvoltage
🟢🔴🔴🔴	1 green, 3 red: the internal voltage of the drive is wrong
🟢🔴🔴🔴🔴	1 green, 4 red: encoder out of tolerance alarm
🟢🔴🔴🔴🔴🔴	1 green, 5 red: drive 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 command overload warning
🟢🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴	1 Green, 12 Red: Motor output saturation timeout warning
🟢🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴	1 green, 13 red: CAN bus failure
🟢🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴	1 green, 14 red: CAN bus disconnection
🟢🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴	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 the 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	Contens of the fault
AL.000	Normal state
AL.100	Parameter reading error A. Typically occurs after a firmware upgrade or when parameter reading operations are performed, the

	version of the stored parameters in the drive EEPROM does not match or the validation error. Need to re-import the firmware and save it.
	B. An alarm occurs when the drive does not upgrade the firmware. It is caused by an error in reading the internal parameters of the drive. Please power off the drive completely for 30s, and then restart the drive to check whether the alarm occurs.
	C. After the B-step operation, the drive still alarms, please try to restore the factory settings, then power off for 30s, and then restart the drive. If the drive 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 during parameter saving, generally due to abnormal communication of EEPROM chip, please completely power off the drive 30s, then restart the drive and carry out parameter save test, if there is still a warning, please contact the manufacturer after-sales or replacement.
AL.103	The drive program is running abnormally The drive program is running abnormally, please contact the manufacturer for after-sales service.
AL.105	Drive parameters do not match Drive P00.34 parameter setting is abnormal, please set this parameter correctly according to the motor model, this parameter is generally1/ 2.
AL.110 AL.111	AL.110: Drive IPM module overcurrent AL.111: Drive ADC overcurrent Whether the motor collides or not causes a blockage Motor P06.00,P06.01, P06.02, P06.28, P06.29 improper settings caused. Try to restore the drive parameters and restart to see if the warning still exists. If a 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 drive to test whether there is an alarm.
AL.112 AL.113	AL.112: Motor command overload AL.113: Motor overheating Check if the motor is colliding causing a blockage Check whether the encoder cable is connected correctly, e.g. the motor encoder cable does not correspond to the correct connection when multi-axis Monitor the driver d03.tF to see the running torque of the motor, and judge whether it is caused by long time overload.
AL.114	Drive IPM module over temperature A.Check the drive housing temperature and ventilation cooling conditions Check that the drive fan is spinning properly
AL.115	Drive internal voltage error The internal voltage failure of the drive is generally caused by the internal hardware of the drive, please contact the manufacturer for after-sales service.
AL.120	Drive Encoder Interference Please check whether the motor PE cable connection is reliable Check that the encoder plug is connected reliably Replace the drive to check whether the fault is caused by the motor encoder
AL.121	Encoder communication error

	The fault occurs when power-up, generally will alarm AL.170 at the same time, please check that the encoder extension cord connection is reliable.
	If the drive simply alarms AL.121, usually caused by a faulty encoder, 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
	Check that 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 drive cannot communicate with the encoder.
	Please check that the encoder cable connection is reliable
AL.128	Encoder type setting error
	Check that the P00.34 parameter value 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 drive is powering on and initializing, power off the drive for 30s, then restart it to see if it still alarms, if it still alarms, please replace the drive.
AL.161	The program detected an SPI communication error
	Update the drive and contact the manufacturer for after-sales service.
AL.162	Read encoder EEPROM fault
AL.163	Save the encoder EEPROM fault
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
	When the initialization of power-on, the check and error of the encoder 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 (read back for verification).
AL.168	Read encoder EEPROM failure
AL.169	Read encoder EEPROM failure
AL.170	Read encoder EEPROM failure
	When power-on initialization occurs, generally due to the encoder extension cable, please check that the extension cable is connected correctly.
AL.171	FPGA initialization error
	It appears during power-on initialization and is caused by abnormal communication between DSP and FPGA.
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 whether the P03.00 parameter setting value 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 Please check whether the parameter setting values of P05.00, P05.01 and P05.02 meet the requirements of the manual or contact the manufacturer.
AL.210	Drive bus voltage is high Please plug in the brake resistance or check the quality of the brake resistance and whether the resistance value is appropriate. Please check whether the AC input power is too high and the drive input power requirement is below 260VAC.
AL.211	Drive bus voltage is low Please check whether the AC input power is indeed too low and the drive input power requirement is below 170VAC. Replace with a new drive to check if the drive 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 plug in the brake resistance or check the quality of the brake resistance and whether the resistance value is appropriate. Please check whether the AC input power is too high and the drive input power requirement is below 260VAC.
AL.213	Torque-limited alarm output
AL.220	Encoder Battery Warning When power-on initialization occurs, the battery voltage is less than3.3V caused, 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 drive 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 cable is abnormal Use the AF.CEN function to clear the alarm When this alarm occurs, the multi-turn encoder data of the drive is already incorrect, and the zero point needs to be reset

AL.230	Overspeed alarm
AL.231	The speed regulator output is saturated Check if the crash is caused Check that the P06.00, P06.01 parameters are set correctly Check that the power cable and the encoder extension cable are properly connected
AL.240	Position is out of tolerance Check that the power cable is properly connected Check that the electronic gear ratio parameters are set correctly Check that the frequency of the pulse input exceeds the maximum speed of the motor
AL.250	No braking feedback The brake feedback circuit of the drive is abnormal, replace the drive or contact the after-sales.
AL.251	Brake timeout Please connect the braking resistor or check whether the resistance of the braking resistor is normal Check that the input AC voltage is within the operating voltage range of the driver calibration
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	drive not enabled	0
Flashing green	the drive is enabled, in normal working condition	0
1 green 1 red	drive overcurrent	110、111
1 green 2 red	drive overvoltage	210、212
1 green 3 red	the internal voltage of the drive is wrong	115
1 green 4red	encoder out of tolerance alarm	140、240、291
1 green 5 red	drive undervoltage	211
1 green 6 red	parameter storage error	100、101
1 green 7 red	abnormal braking (no feedback/timeout)	250、251、253
1 green 8 red	encoder failure	105、120、121、162、163、164、165、222、221、220、166、167、175、168、169、170、128、120、174、191、190、

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	abnormal software operation	103
1 green 16 red	other undefined faults	other undefined faults

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Chapter 8 Appendix

Appendix A SDO Transmission stop code

Stop Code	Function Description
0503 0000h	The trigger bit does not change alternately
0504 0000h	SDO protocol timeout
0504 0001h	Invalid or unknown client/server command word
0504 0005h	Memory overflow
0601 0000h	Object does not support access
0601 0001h	Attempt to read write-only object
0601 0002h	Attempt to write read-only object
0602 0000h	The object does not exist in the object dictionary
0604 0041h	Object cannot be mapped to PDO
0604 0042h	The number and length of the mapped objects exceed the PDO length
0604 0043h	Generic parameters are incompatible
0604 0047h	General device internal incompatibility
0606 0000h	Hardware error caused object access failure
0607 0010h	Data type does not match, service parameter length does not match
0607 0012h	The data type does not match, the length of the service parameter is too large
0607 0013h	The data type does not match, the length of the service parameter is too short
0609 0011h	Sub-index doec not exist
0609 0030h	Value range outside the parameter value
0609 0031h	The write parameter value is too large
0609 0032h	The write parameter value is too small
0609 0036h	The maximum value is less than the minimum value
0800 0000h	General error
0800 0020h	Data cannot be transferred or saved to the application
0800 0021h	Data cannot be transferred or saved to the application due to local control
0800 0022h	Data cannot be transferred or saved to the application due to the current device status
0800 0023h	The object dictionary dynamically generates an error or the object dictionary does not exist
0800 0024h	Value does not exist

Appendix B Servo paramters and object dictionary comparison

Group P00 Servo drive/motor parameters

Parameter number	Object dictionary	Name	Range	Unit	Factory setting	Related mode
P00.00	2000-01h	Motor Number	10000～65535	-	50604	-
P00.01	-	Servo driver model	-	-	-	Display
P00.02	2001-01h	MCU Software version number	-	-	-	Display
P00.03	2001-02h	FPGA Software version	-	-	-	Display
P00.04	2001-03h	EtherCAT Software version	-	-	-	Display

P00.05	-	Driver hardware version	-	-	-	Display
P00.06	-	CAN Software version	-	-	-	Display
P00.07	-	Software non-standard ID	-	-	-	Display
P00.08	-	Hardware non-standard ID	-	-	-	Display
P00.09	-	Driver PWM update mode	-	-	-	Display
P00.17	2000-02h	Rated power	1～65535	0.01KW	-	-
P00.18	2000-03h	Rated voltage	1～380	V	-	-
P00.19	2000-04h	Rated current	1～65535	0.1A	-	-
P00.20	2000-05h	Rated speed	1～6000	rpm	-	-
P00.21	2000-06h	Maximum speed	1～6000	rpm	-	-
P00.22	2000-07h	Rated torque	1～65535	0.01Nm	-	-
P00.23	2000-08h	Maximum torque	1～65535	0.01Nm	-	-
P00.24	2000-09h	Moment of inertia-JM	1～65535	kgcm^2	-	-
P00.25	2000-0Ah	Motor pole pairs	2～360	Antipode	-	-
P00.26	2000-0Bh	Stator resistance	1～65535	0.001Ω	-	-
P00.27	2000-0Ch	Stator inductance-Lq	1～65535	0.01mH	-	-
P00.28	2000-0Dh	Stator inductance-Ld	1～65535	0.01mH	-	-
P00.29	-	Linear back-EMF coefficient	1～65535	0.01mV/rpm	-	-
P00.30	2000-0Eh	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	2002-01h	Encoder Type	0～4	-	2	-
P00.35 P00.36	2002-02h	Absolute encoder offset	0～1073741824	P	0	-
P00.37	2002-03h	Absolute encoder bits	10～23	Bit	17	-
P00.38	-	Incremental encoder resolution	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	2002-04h	Prohibit multi-turn encoder battery fault output	0～1	-	0	-
P00.42	2002-05h	Multi-turn encoder multi-turn bits	0～24	Bit	16	-
P00.43	2002-06h	Driver power-on position calibration torque	0～100	%	90	-
P00.44	2002-07h	Set current position as mechanical zero	0～1	-	0	-
P00.45 P00.46	2002-08h	Encoder single-turn value corresponding to the mechanical zero point of the absolute value system	0～16777216	P	0	-
P00.47 P00.48	2002-09h	The encoder multi-turn value corresponding to the mechanical zero point of the absolute value system	-16777216～16777216	P	0	-
P00.49	2002-0Ah	It is forbidden to use the absolute encoder position to update the current position command	0～1	-	0	-
P00.50 P00.51	-	Frequency division 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	-	-	-	Display
P00.56	-	Rotation mode enable / frequency division 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	Object dictionary	Name	Range	Unit	Factory setting	Related mode
P01.00	2003-01h	Control mode selection	0～7	-	0	-
P01.01	2003-02h	Direction selection	0～1	-	0	-
P01.20	2003-03h	Min resistance value	-	Ω	-	Display
P01.21	2003-04h	Power of Built-in brake resistance	-	W	-	Display
P01.22	2003-05h	Value of Built-in brake resistance	-	Ω	-	Display
P01.23	2003-06h	Heat dissipation coefficient of resistance	1～100	%	20	-
P01.24	2003-07h	Resistance selection : 0-IN/1-EX	0～1	-	0	-
P01.25	2003-08h	Power of external brake resistance	1～65535	W	50	-
P01.26	2003-09h	Value of external brake resistance	1～1000	Ω	10	-
P01.27	2003-0Ah	Brake active voltage	1～100		68	-
P01.28	2003-0Bh	Brake feedback detection mode (do not set)	0～1		1	-
P01.29	2003-0Ch	Max brake time	1～1000	ms	3000	-
P01.33	2003-0Dh	Emergency stop deceleration time constant	1～65535	ms	5	-
P01.36	2003-0Fh	Servo enables time-lapse shutdown	0～65535	ms	50	-
P01.37	-	Speed regulator saturation detection time	0～65535	10ms	450	-
P01.42	-	Detection point at the beginning of instruction overload	0～300	%	100	-
P01.43	-	Instruction overload peak detection point	0～300	%	300	-
P01.44	-	Instruction overload detection point	0～65535	10ms	450	-
P01.45	-	Initial detection point of thermal overload	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 alarm threshold	1～100	V	85	-
P01.49	-	Undervoltage alarm threshold	1～100	V	15	-

Group P02 Terminal input/output parameters

Parameter number	Object dictionary	Name	Range	Unit	Factory setting	Related mode
P02.00	2004-01h	IN1 Terminal function selection	0～31	-	1	-
P02.01	2004-02h	IN1 Terminal logical selection	0～1	-	0	-
P02.02	2004-03h	IN2 Terminal function selection	0～31	-	5	-
P02.03	2004-04h	IN2 Terminal logical selection	0～1	-	0	-

P02.04	2004-05h	IN3 Terminal function selection	0～31	-	6	-
P02.05	2004-06h	IN3 Terminal logical selection	0～1	-	0	-
P02.06	2004-07h	IN4 Terminal function selection	0～31	-	23	-
P02.07	2004-08h	IN4 Terminal logical selection	0～1	-	0	-
P02.08	2004-09h	IN5 Terminal function selection	0～31	-	0	-
P02.09	2004-0Ah	IN5 Terminal logical selection	0～1	-	0	-
P02.10	2004-0Bh	IN6 Terminal function selection	0～31	-	0	-
P02.11	2004-0Ch	IN6 Terminal logical selection	0～1	-	0	-
P02.12	2004-0Dh	IN7 Terminal function selection	0～31	-	0	-
P02.13	2004-0Eh	IN7 Terminal logical selection	0～1	-	0	-
P02.14	2004-0Fh	IN8 Terminal function selection	0～31	-	0	-
P02.15	2004-10h	IN8 Terminal logical selection	0～1	-	0	-
P02.16	-	IN9 Terminal function selection	0～31	-	0	-
P02.17	-	IN9 Terminal logical selection	0～1	-	0	-
P02.32	2005-01h	OUT1 Terminal function selection	0～31	-	1	-
P02.33	2005-02h	OUT1 Terminal logical selection	0～1	-	0	-
P02.34	2005-03h	OUT2 Terminal function selection	0～31	-	6	-
P02.35	2005-04h	OUT2 Terminal logical selection	0～1	-	0	-
P02.36	2005-05h	OUT3 Terminal function selection	0～31	-	0	-
P02.37	2005-06h	OUT3 Terminal logical selection	0～1	-	0	-
P02.52	-	IN Terminal force active	0～65535	-	0	-
P02.53	-	OUT Terminal force active	0～65535	-	0	-
P02.54 P02.55	-	FunIN Function Flag	-	-	-	Display
P02.56 P02.57	-	FunIN Function Rasing Edge Flag	-	-	-	Display
P02.58 P02.59	-	FunIN Function Falling Edge Flag	-	-	-	Display
P02.60 P02.61	-	FunOUT Function Flag	-	-	-	Display
P02.62	-	Physical Output Enable	0～65535	-	0	-
P02.63	-	Physical Output Status	0～65535	-	0	-

Group P03 Position control parameters

Parameter number	Object dictionary	Name	Range	Unit	Factory setting	Related mode
P03.00	-	Position command source	0～10	-	0	P
P03.02	-	External impulse command type	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	-	The number of instructions per turn of the motor	0～8388608	P/r	10000	P
P03.08 P03.09	6091-01h	Electronic gear ratio numerator 1	1～1073741824	-	1	P

P03.10 P03.11	6091-02h	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	6068-00h	Completion window time in place	0～65535	ms	10	P
P03.21	2006-07h	Threshold unit for completion in place	0～1	-	0	P
P03.22	6067-00h	Positioning completion threshold	1～65535	Encoder unit	10	P
P03.23	2006-01h	Clear position error action selection	0～1	-	0	P
P03.24	-	Position error alarm is invalid	0～1	-	0	P
P03.25 P03.26	6065-00h	Position error alarm threshold	1～1073741824	Encoder unit	1310720	P
P03.27	-	Reserve	-	-	-	-
P03.28	-	Position command L	-2^{31}～2^{31}-1	Command unit	10000	P
P03.30	-	Maximum speed	0～6000	rpm	1000	P
P03.31	-	Acceleration time	1～65535	1ms	200	P
P03.32	-	Deceleration time	1～65535	1ms	200	P
P03.40	-	Home active	0～6	-	1	P
P03.41	2006-02h	Home method	0～13	-	0	P
P03.42	-	Home speed - High	0～3000	rpm	100	P
P03.43	-	Home speed - Low	0～1000	rpm	50	P
P03.44	-	Home acc/dec time	1～65535	ms	100	P
P03.45	2006-03h	Reserve	-	-	-	-
P03.46 P03.47	-	Home offset	-2^{31}～2^{31}-1	-	0	P
P03.49	-	Limit action when homing	0～3	-	0	P
P03.50	-	Time shreshold in Hard home mode	0～65535	ms	100	P
P03.51	-	Speed shreshold in Hard home mode	0～1000	rpm	10	P
P03.52	-	Torque shreshold in Hard home mode	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	-2^{31}～2^{31}-1	Command unit	10000	P

Group P04 Speed control parameters

Parameter number	Object dictionary	Name	Range	Unit	Factory setting	Related mode
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	2007-01h	Speed - Jogmode	0～6000	rpm	1000	S
P04.05	-	Acc time - Jogmode	1～65535	ms	200	S

P04.06	-	Dec time - Jogmode	1～65535	ms	200	S
P04.07	-	Zero speed clamp speed threshold	0～3000	rpm	10	S
P04.14	-	Speed reaches signal threshold	0～6000	rpm	1000	S
P04.15	-	Reserve	-	-	-	-
P04.16	-	Jog+ Speed in speed mode	0～6000	rpm	200	S
P04.17	-	Jog- Speed in speed mode	0～6000	rpm	200	S
P04.18	-	Acc time in speed mode	1～65535	ms	100	S
P04.19	-	Dec time in speed mode	1～65535	ms	100	S
P04.20	-	Jog+ Speed in position mode	0～6000	rpm	200	S
P04.21	-	Jog- Speed in position mode	0～6000	rpm	200	S
P04.22	-	Acc time in position mode	1～65535	ms	100	S
P04.23	-	Dec time in position mode	1～65535	ms	100	S
P04.24 P04.25	-	Position mode fixed-length stroke	0～1073741824	Command unit	10000	P
P04.60	-	Position cmd - Debug mode	0～1073741824	P	50000	S
P04.62	-	Speed - Debug mode	0～6000	rpm	1000	S
P04.63	-	Acc time - Debug mode	1～65535	ms	200	S
P04.64	-	Dec time - Debug mode	1～65535	ms	200	S
P04.65	-	Motion test active	0～1	-	0	S
P04.66	-	Start direction	0～1	-	0	S
P04.67	-	Motion times	0～65535	-	0	S
P04.68	-	Speed - open loop	0～3000	rpm	100	-
P04.69	-	Acc - open loop	1～100	r/s^2	10	-
P04.70	-	Dec - open loop	1～100	r/s^2	10	-
P04.71	-	Torque - open loop	0～100	%	50	-
P04.72	-	Active - open loop	0～6	-	0	-
P04.73	-	Elec angle when lock motor	0～65535	-	0	-
P04.74	-	Torque - lock motor	0～100	%	50	-
P04.75	-	Lock motor active	0～1	-	0	-
P04.76	-	Speed for encoder Calibration	1～100	rpm	10	-
P04.77	-	Acc for encoder Calibration	1～10	r/s^2	1	-
P04.78	-	Dec for encoder Calibration	1～10	r/s^2	1	-
P04.79	-	Torque for encoder Calibration	0～100	%	85	-
P04.80	-	Start encoder Calibration	0～1	-	0	-
P04.81	-	Encoder error counter:Data miss	-	-	-	Display
P04.82	-	Encoder error counter:Data Null	-	-	-	Display
P04.83	-	Encoder error counter:CRC error	-	-	-	Display
P04.84	-	Encoder error counter:SCI error	-	-	-	Display
P04.85	-	Encoder error counter:Consecutive errors	-	-	-	Display

Group P05 Torque control parameters

Parameter	Object	Name	Range	Unit	Factory	Related

number	dictionary				setting	mode
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 Set Value From Panel	-3000~3000	0.1%	200	T
P05.04	6072-00h	Max Torque Limit	0~3000	0.1%	3000	T
P05.05	6087-00h	Torque Profile Slop	1~65535	0.1%/s	3000	T
P05.06	2008-03h	Torque Limit Source (Reserve)	0~4	-	0	T
P05.07	-	Torque limit source AI channel (reserved)	0~1	-	0	T
P05.08	2008-04h	Inside Pos Torque Limit (Reserve)	0~3000	0.1%	3000	T
P05.09	2008-05h	Inside Neg Torque Limit (Reserve)	0~3000	0.1%	3000	T
P05.10	-	Outside Pos Torque Limit (Reserve)	0~3000	0.1%	3000	T
P05.11	-	Outside Neg Torque Limit (Reserve)	0~3000	0.1%	3000	T
P05.12	2008-07h	Speed Limit Source	0~1	-	0	T
P05.13	-	Speed limit analog channel source (reserved)	0~1	-	0	T
P05.14	2008-08h	Inside Pos Speed Limit	0~6000	rpm	3000	T
P05.15	2008-09h	Inside Neg Speed Limit	0~6000	rpm	0	T
P05.16	2008-0Ah	Torque Arrive Base value	0~65535	0.1%	0	T
P05.17	2008-0Bh	Torque Arrive Valid value	0~65535	0.1%	100	T
P05.18	2008-0Ch	Torque Arrive Invalid value	0~65535	0.1%	50	T
P05.19	2008-0Dh	Torque Arrive Output Time	0~65535	Ms	50	T
P05.20	-	Torque Cmd from Communication	0~3000	0.1%	200	T
P05.21	-	Acc time	1~65535	ms	100	T
P05.22	-	Dec time	1~65535	ms	100	T
P05.23	-	Torque holding time	0~65535	ms	500	T
P05.24	-	Operation 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 (Reserve)	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	Object dictionary	Name	Range	Unit	Factory setting	Related mode
P06.00	2009-01h	First velocity loop gain	0~65535	0.1Hz	4500	-
P06.01	2009-02h	First velocity loop integral	1~30000	0.1ms	3500	-
P06.02	2009-03h	First position loop gain	0~5000	0.1Hz	500	-
P06.03	2009-04h	Second velocity loop gain	0~65535	0.1Hz	4500	-

P06.04	2009-05h	Second velocity loop integral	1～30000	0.1ms	3500	-
P06.05	2009-06h	Second position loop gain	0～5000	0.1Hz	500	-
P06.06	2009-07h	Skd	0～65535	-	0	-
P06.07	2009-08h	Skr	0～65535	-	1000	-
P06.08	2009-09h	Skm	0～65535	-	0	-
P06.09	-	Pki	0～65535	-	0	-
P06.10	-	Pkd	0～65535	-	0	-
P06.14	2009-0Ah	Velocity feedforward low-pass filter cut-off frequency	0～10000	Hz	2000	-
P06.15	2009-0Bh	Velocity feedforward gain	0～1000	0.1%	0	-
P06.16	2009-0Ch	Torque feedforward low-pass filter cut-off frequency	0～10000	Hz	2000	-
P06.17	2009-0Dh	Torque feedforward gain	0～1000	0.1%	0	-
P06.18	2009-0Eh	Reserve	-	-	-	-
P06.19	2009-10h	Velocity low pass filter cut-off frequency 1	0～10000	Hz	1000	-
P06.20	2009-11h	Velocity low pass filter cut-off frequency 2	0～10000	Hz	2000	-
P06.21	-	Reserve	-	-	-	-
P06.24	200-13h	Torque command low-pass filter cut-off frequency 1	0～10000	Hz	1000	-
P06.25	-	Reserve	-	-	-	-
P06.26	2009-14h	Torque feedback low-pass filter cut-off frequency 1	0～10000	Hz	1000	-
P06.27	-	Reserve	-	-	-	-
P06.28	2009-15h	Current loop proportional gain	0～50000	Hz	1000	-
P06.29	2009-16h	Current loop integral time constant	0～10000	0.1ms	1500	-
P06.30	-	PVIA algorithm proportional gain Kp	0～50000	-	3000	-
P06.31	-	PVIA algorithm integral gain Ki	0～10000	-	1000	-
P06.32	-	PVIA algorithm speed gain Kv1	0～50000	-	1000	-
P06.33	-	PVIA algorithm speed gain Kv2	0～50000	-	100	-
P06.34	-	PVIA algorithm acceleration gain Ka	0～50000	-	0	-
P06.35	-	PVIA algorithm speed gain Kvff	0～50000	-	1000	-
P06.36	-	PVIA algorithm acceleration gain Kaff	0～50000	-	0	-
P06.37	-	PVIA algorithm command speed low-pass filter cut-off frequency	1～10000	Hz	1000	-
P06.38	-	PVIA algorithm command acceleration low-pass filter cut-off frequency	1～10000	Hz	2000	-
P06.39	-	PVIA algorithm feedback acceleration low-pass filter cut-off frequency	1～10000	Hz	2000	-
P06.40	-	PVIA algorithm 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	Object dictionary	Name	Range	Unit	Factory setting	Related mode
P08.00	-	RS485 address	1～247	-	1	-
P08.01	-	RS485 Baud rate setting	0～5	-	5	-
P08.02	-	RS485 data format	0～5	-	0	-
P08.05	-	CAN Address	1～127	-	2	-
P08.06	-	CAN Baud rate setting	0～6	-	4	-
P08.07	-	CAN Time Out	0～65535	ms	0	-
P08.08	-	EtherCAT Address	-	-	-	Display
P08.09	-	Alias Address	-	-	-	Display
P08.10	-	EtherCAT Address Setting	0～65535	-	0	-
P08.30	-	RS232 address	Display	-	1	-
P08.31	-	RS232 Baud rate setting	0～5	-	5	-
P08.32	-	RS232 data format	0～5	-	0	-

Group P09 Multi-segment position parameters

Parameter number	Object dictionary	Name	Range	Unit	Factory setting	Related mode
P09.00	-	Multi-segment position operation mode	0～2	-	1	P
P09.01	-	End points of position	0～16	-	1	P
P09.03	-	Time units	0～1	-	0	P
P09.04	-	Position command type selection	0～1	-	0	P
P09.12 P09.13	-	Displacement in section 1	-1073741824～1073741824	Command unit	10000	P
P09.14	-	speed in section 1	1～6000	rpm	200	P
P09.15	-	Acc and Dec time in section 1	1～65535	ms	100	P
P09.16	-	Wait time in section 1	0～65535	ms(s)	100	P
P09.17 P09.18	-	Displacement in section 2	-1073741824～1073741824	Command unit	10000	P
P09.19	-	speed in section 2	1～6000	rpm	200	P
P09.20	-	Acc and Dec time in section 2	1～65535	ms	100	P
P09.21	-	Wait time in section 2	0～65535	ms(s)	100	P
P09.22 P09.23	-	Displacement in section 3	-1073741824～1073741824	Command unit	10000	P
P09.24	-	speed in section 3	1～6000	rpm	200	P
P09.25	-	Acc and Dec time in section 3	1～65535	ms	100	P
P09.26	-	Wait time in section 3	0～65535	ms(s)	100	P
P09.27 P09.28	-	Displacement in section 4	-1073741824～1073741824	Command unit	10000	P
P09.29	-	speed in section 4	1～6000	rpm	200	P

P09.30	-	Acc and Dec time in section 4	1～65535	ms	100	P
P09.31	-	Wait time in section 4	0～65535	ms(s)	100	P
P09.32 P09.33	-	Displacement in section 5	-1073741824～ 1073741824	Command unit	10000	P
P09.34	-	speed in section 5	1～6000	rpm	200	P
P09.35	-	Acc and Dec time in section 5	1～65535	ms	100	P
P09.36	-	Wait time in section 5	0～65535	ms(s)	100	P
P09.37 P09.38	-	Displacement in section 6	-1073741824～ 1073741824	Command unit	10000	P
P09.39	-	speed in section 6	1～6000	rpm	200	P
P09.40	-	Acc and Dec time in section 6	1～65535	ms	100	P
P09.41	-	Wait time in section 6	0～65535	ms(s)	100	P
P09.42 P09.43	-	Displacement in section 7	-1073741824～ 1073741824	Command unit	10000	P
P09.44	-	speed in section 7	1～6000	rpm	200	P
P09.45	-	Acc and Dec time in section 7	1～65535	ms	100	P
P09.46	-	Wait time in section 7	0～65535	ms(s)	100	P
P09.47 P09.48	-	Displacement in section 8	-1073741824～ 1073741824	Command unit	10000	P
P09.49	-	speed in section 8	1～6000	rpm	200	P
P09.50	-	Acc and Dec time in section 8	1～65535	ms	100	P
P09.51	-	Wait time in section 8	0～65535	ms(s)	100	P
P09.52 P09.53	-	Displacement in section 9	-1073741824～ 1073741824	Command unit	10000	P
P09.54	-	speed in section 9	1～6000	rpm	200	P
P09.55	-	Acc and Dec time in section 9	1～65535	ms	100	P
P09.56	-	Wait time in section 9	0～65535	ms(s)	100	P
P09.57 P09.58	-	Displacement in section 10	-1073741824～ 1073741824	Command unit	10000	P
P09.59	-	speed in section 10	1～6000	rpm	200	P
P09.60	-	Acc and Dec time in section 10	1～65535	ms	100	P
P09.61	-	Wait time in section 10	0～65535	ms(s)	100	P
P09.62 P09.63	-	Displacement in section 11	-1073741824～ 1073741824	Command unit	10000	P
P09.64	-	speed in section 11	1～6000	rpm	200	P
P09.65	-	Acc and Dec time in section 11	1～65535	ms	100	P
P09.66	-	Wait time in section 11	0～65535	ms(s)	100	P
P09.67 P09.68	-	Displacement in section 12	-1073741824～ 1073741824	Command unit	10000	P
P09.69	-	speed in section 12	1～6000	rpm	200	P
P09.70	-	Acc and Dec time in section 12	1～65535	ms	100	P
P09.71	-	Wait time in section 12	0～65535	ms(s)	100	P
P09.72 P09.73	-	Displacement in section 13	-1073741824～ 1073741824	Command unit	10000	P
P09.74	-	speed in section 13	1～6000	rpm	200	P
P09.75	-	Acc and Dec time in section 13	1～65535	ms	100	P
P09.76	-	Wait time in section 13	0～65535	ms(s)	100	P
P09.77 P09.78	-	Displacement in section 14	-1073741824～ 1073741824	Command unit	10000	P

P09.79	-	speed in section 14	1～6000	rpm	200	P
P09.80	-	Acc and Dec time in section 14	1～65535	ms	100	P
P09.81	-	Wait time in section 14	0～65535	ms(s)	100	P
P09.82 P09.83	-	Displacement in section 15	-1073741824～ 1073741824	Command unit	10000	P
P09.84	-	speed in section 15	1～6000	rpm	200	P
P09.85	-	Acc and Dec time in section 15	1～65535	ms	100	P
P09.86	-	Wait time in section 15	0～65535	ms(s)	100	P
P09.87 P09.88	-	Displacement in section 16	-1073741824～ 1073741824	Command unit	10000	P
P09.89	-	speed in section 16	1～6000	rpm	200	P
P09.90	-	Acc and Dec time in section 16	1～65535	ms	100	P
P09.91	-	Wait time in section 16	0～65535	ms(s)	100	P

Group P10 Multi-segment speed parameters

Parameter number	Object dictionary	Name	Range	Unit	Factory setting	Related mode
P10.00	-	Multi-segment speed command running mode	0～2	-	1	S
P10.01	-	End poiont of speed command	0～16	-	16	S
P10.02	-	Running time unit	0～1	-	0	S
P10.03	-	Acceleration time 1	1～65535	ms	200	S
P10.04	-	Deceleration time 1	1～65535	ms	200	S
P10.05	-	Acceleration time 2	1～65535	ms	200	S
P10.06	-	Deceleration time 2	1～65535	ms	200	S
P10.07	-	Acceleration time 3	1～65535	ms	200	S
P10.08	-	Deceleration time 3	1～65535	ms	200	S
P10.09	-	Acceleration time 4	1～65535	ms	200	S
P10.10	-	Deceleration time 4	1～65535	ms	200	S
P10.11	-	Acceleration time 5	1～65535	ms	200	S
P10.12	-	Deceleration time 5	1～65535	ms	200	S
P10.13	-	Acceleration time 6	1～65535	ms	200	S
P10.14	-	Deceleration time 6	1～65535	ms	200	S
P10.15	-	Acceleration time 7	1～65535	ms	200	S
P10.16	-	Deceleration time 7	1～65535	ms	200	S
P10.20	-	Section 1 speed command	-6000～6000	rpm	100	S
P10.21	-	Section 1 speed command running time	0～65535	0.1sec 0.1min	10	S
P10.22	-	Section 1 Acc/Dec time selection	1～7	-	1	S
P10.23	-	Section 2 speed command	-6000～6000	rpm	200	S
P10.24	-	Section 2 speed command running time	0～65535	0.1sec 0.1min	20	S
P10.25	-	Section 2 Acc/Dec time selection	1～7	-	1	S
P10.26	-	Section 3 speed command	-6000～6000	rpm	300	S
P10.27	-	Section 3 speed command running time	0～65535	0.1sec 0.1min	30	S

P10.28	-	Section 3 Acc/Dec time selection	1～7	-	1	S
P10.29	-	Section 4 speed command	-6000～6000	rpm	400	S
P10.30	-	Section 4 speed command running time	0～65535	0.1sec 0.1min	40	S
P10.31	-	Section 4 Acc/Dec time selection	1～7	-	1	S
P10.32	-	Section 5 speed command	-6000～6000	rpm	500	S
P10.33	-	Section 5 speed command running time	0～65535	0.1sec 0.1min	50	S
P10.34	-	Section 5 Acc/Dec time selection	1～7	-	1	S
P10.35	-	Section 6 speed command	-6000～6000	rpm	600	S
P10.36	-	Section 6 speed command running time	0～65535	0.1sec 0.1min	60	S
P10.37	-	Section 6 Acc/Dec time selection	1～7	-	1	S
P10.38	-	Section 7 speed command	-6000～6000	rpm	700	S
P10.39	-	Section 7 speed command running time	0～65535	0.1sec 0.1min	70	S
P10.40	-	Section 7 Acc/Dec time selection	1～7	-	1	S
P10.41	-	Section 8 speed command	-6000～6000	rpm	800	S
P10.42	-	Section 8 speed command running time	0～65535	0.1sec 0.1min	80	S
P10.43	-	Section 8 Acc/Dec time selection	1～7	-	1	S
P10.44	-	Section 9 speed command	-6000～6000	rpm	900	S
P10.45	-	Section 9 speed command running time	0～65535	0.1sec 0.1min	90	S
P10.46	-	Section 9 Acc/Dec time selection	1～7	-	1	S
P10.47	-	Section 10 speed command	-6000～6000	rpm	1000	S
P10.48	-	Section 10 speed command running time	0～65535	0.1sec 0.1min	100	S
P10.49	-	Section 10 Acc/Dec time selection	1～7	-	1	S
P10.50	-	Section 11 speed command	-6000～6000	rpm	1100	S
P10.51	-	Section 11 speed command running time	0～65535	0.1sec 0.1min	110	S
P10.52	-	Section 11 Acc/Dec time selection	1～7	-	1	S
P10.53	-	Section 12 speed command	-6000～6000	rpm	1200	S
P10.54	-	Section 12 speed command running time	0～65535	0.1sec 0.1min	120	S
P10.55	-	Section 12 Acc/Dec time selection	1～7	-	1	S
P10.56	-	Section 13 speed command	-6000～6000	rpm	1300	S
P10.57	-	Section 13 speed command running time	0～65535	0.1sec 0.1min	130	S
P10.58	-	Section 13 Acc/Dec time selection	1～7	-	1	S
P10.59	-	Section 14 speed command	-6000～6000	rpm	1400	S
P10.60	-	Section 14 speed command running time	0～65535	0.1sec 0.1min	140	S
P10.61	-	Section 14 Acc/Dec time selection	1～7	-	1	S
P10.62	-	Section 15 speed command	-6000～6000	rpm	1500	S
P10.63	-	Section 15 speed command running time	0～65535	0.1sec 0.1min	150	S
P10.64	-	Section 15 Acc/Dec time selection	1～7	-	1	S
P10.65	-	Section 16 speed command	-6000～6000	rpm	1600	S
P10.66	-	Section 16 speed command running time	0～65535	0.1sec 0.1min	160	S

| P10.67 | - | Section 16 Acc/Dec time selection | 1～7 | - | 1 | S |

Group P11 Auxiliary display

Parameter number	Object dictionary	Name	Range	Unit	Factory setting	Related mode
P11.00	603F-00h	0x603F(Error code)	-	-	-	Display
P11.01	6040-00h	0x6040(Control word)	-	-	-	Display
P11.02	6041-00h	0x6041(Status word)	-	-	-	Display
P11.03	605A-00h	0x605A(Quick stop mode selection)	-	-	-	Display
P11.04	605B-00h	0x605B(Shutdown mode selection)	-	-	-	Display
P11.05	605C-00h	0x605C(Prohibition of operation mode selection)	-	-	-	Display
P11.06	605E-00h	0x605E(Failure shutdown mode selection)	-	-	-	Display
P11.07	6060-00h	0x6060(Mode selection)	-	-	-	Display
P11.08	6061-00h	0x6061(Operation mode display)	-	-	-	Display
P11.09 P11.10	6062-00h	0x6062(Position command)	-	Command unit	-	Display
P11.11 P11.12	6063-00h	0x6063(Position feedback)	-	Encoder unit	-	Display
P11.13 P11.14	6064-00h	0x6064(Position feedback)	-	Command unit	-	Display
P11.15 P11.16	6065-00h	0x6065(Excessive position deviation threshold)	-	Command unit	-	Display
P11.17	6066-00h	0x6066(Position deviation time window)	-	ms	-	Display
P11.18 P11.19	6067-00h	0x6067(Position reaching threshold)	-	指令单位	-	Display
P11.20	6068-00h	0x6068(Position arrival time window)	-	ms	-	Display
P11.21 P11.22	606C-00h	0x606C(Speed feedback)	-	指令单位/s	-	Display
P11.23	606D-00h	0x606D(Speed reaching threshold)	-	rpm	-	Display
P11.24	606E-00h	0x606E(Speed arrival time window)	-	ms	-	Display
P11.25	6071-00h	0x6071(Target torque)	-	0.1%	-	Display
P11.26	6072-00h	0x6072(Maximum torque)	-	01%	-	Display
P11.27	6073-00h	0x6073(Maximum current)	-	0.1%	-	Display
P11.28	6074-00h	0x6074(Internal target torque)	-	0.1%	-	Display
P11.29	6077-00h	0x6077(Torque feedback)	-	0.1%	-	Display
P11.30 P11.31	607A-00h	0x607A(Target position)	-	Command unit	-	Display
P11.32 P11.33	607C-00h	0x607C(Origin offset)	-	Command unit	-	Display
P11.34 P11.35	607D-01h	0x607D_1(Minimum software absolute position limit)	-	Command unit	-	Display
P11.36 P11.37	607D-02h	0x607D_2(Maximum software absolute position limit)	-	Command unit	-	Display
P11.38	607E-00h	0x607E(Command polarity)	-	-	-	Display
P11.39 P11.40	607F-00h	0x607F(Maximum contour speed)	-	Command unit/s	-	Display
P11.41 P11.42	6081-00h	0x6081(Contour speed)	-	Command unit/s	-	Display
P11.43 P11.44	6083-00h	0x6083(Contour acceleration)	-	Command unit/s^2	-	Display

P11.45 P11.46	6084-00h	0x6084(Contour deceleration)	-	Command unit/s^2	-	Display
P11.47 P11.48	6085-00h	0x6085(Rapid stop deceleration)	-	Command unit/s^2	-	Display
P11.49 P11.50	6087-00h	0x6087(Torque ramp)	-	0.1%/s	-	Display
P11.51 P11.52	6091-01h	0x6091_1(Gear ratio numerator/motor resolution)	-	-	-	Display
P11.53 P11.54	6092-02h	0x6091_2(Gear ratio denominator/shaft resolution)	-	-	-	Display
P11.55	6098-00h	0x6098(Homing mode)	-	-	-	Display
P11.56 P11.57	6099-01h	0x6099_1(Search deceleration point signal speed)	-	Command unit/s	-	Display
P11.58 P11.59	6099-02h	0x6099_2(Search homing signal speed)	-	Command unit/s	-	Display
P11.60 P11.61	609A-00h	0x609A(Homing acceleration)	-	Command unit/s^2	-	Display
P11.62 P11.63	60B0-00h	0x60B0(Position offset)	-	Command unit	-	Display
P11.64 P11.65	60B1-00h	0x60B1(Speed offset)	-	Command unit/s	-	Display
P11.66	60B2-0h	0x60B2(Torque offset)	-	0.1%	-	Display
P11.67	60B8-00h	0x60B8(Probe function)	-	-	-	Display
P11.68	60B9-00h	0x60B9(Probe status)	-	-	-	Display
P11.69 P11.70	60BA-00h	0x60BA(Probe 1 rising edge position feedback)	-	Command unit	-	Display
P11.71 P11.72	60BB-00h	0x60BB(Probe 1 falling edge position feedback)	-	Command unit	-	Display
P11.73 P11.74	60BC-00h	0x60BC(Probe 2 rising edge position feedback)	-	Command unit	-	Display
P11.75 P11.76	60BD-00h	0x60BD(Probe 2 falling edge position feedback)	-	Command unit	-	Display
P11.77	60D5-00h	0x60D5(Probe 1 rising edge counter)	-	-	-	Display
P11.78	60D6-00h	0x60D6(Probe 1 falling edge counter)	-	-	-	Display
P11.79	60D7-00h	0x60D7(Probe 2 rising edge counter)	-	-	-	Display
P11.80	60D8-00h	0x60D8(Probe 2 falling edge counter)	-	-	-	Display
P11.81	60E0-00h	0x60E0(Maximum forward torque limit)	-	0.1%	-	Display
P11.82	60E1-00h	0x60E1(Negative maximum torque limit)	-	0.1%	-	Display
P11.83 P11.84	60F4-00h	0x60F4(Position deviation)	-	Command unit	-	Display
P11.85 P11.86	60FC-00h	0x60FC(Position command)	-	Command unit	-	Display
P11.87 P11.88	60FD-00h	0x60FD(Digital input)	-	-	-	Display
P11.89 P11.90	60FE-01h	0x60FE_1(Physical output enable)	-	-	-	Display
P11.91 P11.92	60FE-02h	0x60FE_2(Physical output status)	-	-	-	Display
P11.93 P11.94	60FF-00h	0x60FF(Target speed)	-	Command unit/s	-	Display
P11.95 P11.96	6052-00h	0x6052(Supported servo operation mode)	-	-	-	Display

Group P12 Auxiliary function

Parameter number	Object dictionary	Name	Range	Unit	Factory setting	Related mode
P12.00	1010-01h	Save parameters to the EEPROM of	0～1	-	0	-

		the drive				
P12.01	-	Read the parameters from the EEPROM of the drive	0～1	-	0	-
P12.02	1011-01h	Restore factory default parameter values	0～1	-	0	-
P12.03	-	Reset drive 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 drive	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 command	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	Object dictionary	Name	Range	Unit	Factory setting	Related mode
P13.00	-	Running status	-	-	-	Display
P13.01	-	Motor speed	-	rpm	-	Display
P13.02	-	Speed command	-	rpm	-	Display
P13.03	-	Motor torque	-	%	-	Display
P13.04	-	Torque command	-	%	-	Display
P13.05	-	Running current	-	%	-	Display
P13.07 P13.08	-	Position command counter	-	Command unit	-	Display
P13.09 P13.10	-	Position command counter*	-	Encoder unit	-	Display
P13.11 P13.12	-	Position feedback counter	-	Encoder unit	-	Display
P13.13 P13.14	-	Position deviation counter	-	Command unit	-	Display
P13.15 P13.16	-	Position deviation counter	-	Encoder unit	-	Display
P13.17	-	Position command speed	-	rpm	-	Display
P13.18	-	Position command frequency	-	KHz	-	Display

P13.19	-	Input signal monitoring	-	-	-	Display
P13.20	-	Output signal monitoring	-	-	-	Display
P13.21 P13.22	-	The current mechanical angle of the motor	-	Encoder unit	-	Display
P13.23	-	The current electrical angle of the motor	-	Degree	-	Display
P13.24	-	The current voltage value of the drive	-	0.1V	-	Display
P13.25 P13.26	-	Encoder status register	-	-	-	Display
P13.27 P13.28	-	External pulse counter	-	Command unit	-	Display
P13.29	-	Frequency division output pulse count	-	Command unit	-	Display
P13.30 P13.31	-	Current position of the motor	-	Command unit	-	Display
P13.32 P13.33	-	Target position	-	Command unit	-	Display
P13.36	-	Error code	-	-	-	Display
P13.40 P13.41	-	Motor encoder single-turn value	-	Encoder unit	-	Display
P13.42 P13.43	-	Motor encoder multi-turn value	-	Turn	-	Display

Appendix C Servo detailed parameters

Group P00：Servo drive/Motor parameters

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

P00.01	Name	Servo drive model			Related mode	Display
	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
	Range	XXX.YY	Unit	-	Factory setting	-

P00.03	Name	FPGA software version			Related mode	Display
	Range	XXX.YY	Unit	-	Factory setting	-

P00.04	Name	EtherCAT software version			Related mode	Display
	Range	XXX.YY	Unit	-	Factory setting	-

P00.05	Name	Driver hardware version			Related mode	Display
	Range	XXX.YY	Unit	-	Factory setting	-

P00.06	Name	CAN software version			Related mode	Display
	Range	XXX.YY	Unit	-	Factory setting	-

P00.07	Name	Software non-standard ID			Related mode	Display
	Range	-	Unit	-	Factory setting	-

P00.08	Name	Hardware non-standard ID			Related mode	Display
	Range	-	Unit	-	Factory setting	-

P00.09	Name	Driver PWM update mode			Related mode	Display
	Range	-	Unit	-	Factory setting	-

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

P00.34	Name	Encoder type			Related mode	-
	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	Name	Absolute encoder offset			Related mode	-
P00.36	Range	0～1073741824	Unit	P	Factory setting	0

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

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

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

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

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

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

P00.43	Name	Driver power-on position calibration torque			Related mode	-
	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	-
	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	Name	Encoder single-turn value corresponding to the mechanical zero of the absolute value system			Related mode	-
P00.46	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	Name	Encoder multi-turn value corresponding to the mechanical zero of the absolute value system		Related mode	-
P00.48	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	-
	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	Name	Frequency division output gear ratio numerator		Related mode	-
P00.51	Range	1～8388608	Unit	-	Factory setting	10000

P00.52	Name	Frequency division output gear ratio denominator		Related mode	-
P00.53	Range	1～8388608	Unit	-	Factory setting	131072

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

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

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

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

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

Group P01：Basic control parameters

P01.00	Name	Control mode selection		Related mode	-
	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	-
	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
	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
	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
	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	-
	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
	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	-
	Range	1～65535	Unit	W	Factory setting	50

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

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

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

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

P01.33	Name	Emergency stop deceleration time constant			Related mode	-
	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	-
	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	-
	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		-
	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		-
	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		-
	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		-
	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		-
	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		-
	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	-
	Range	1～100	Unit	V	Factory setting	85

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

Group P02：Terminal input/output parameters

P02.00	Name	IN1 terminal function selection			Related mode	-
	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	-
	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	-
	Range	0～31	Unit	-	Factory setting	5

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

P02.32	Name	OUT1 terminal function selection		Related mode	-
	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	-
	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	-
	Range	0～31	Unit -	Factory setting	6

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

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

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

P02.52	Name	IN terminal forced effective			Related mode	-
	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	-
	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	-
	Range	-	Unit	-	Factory setting	Display

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	Name	The rising edge of the FunIN function latches the valid flag			Related mode	-
P02.57	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	Name	The falling edge of the FunIN function latches the valid flag			Related mode	-
P02.59	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	Name	FunOUT function valid flag			Related mode	-
P02.61	Range	-	Unit	-	Factory setting	Display

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	-
	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	-
	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

Group P03：Position control parameters

P03.00	Name	Position command source		Related mode	-
	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	Command	Command acquisition method

value	source	
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	-
	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	PUL DIR 高	PUL DIR 低
	1	Pulse + direction Negative logic	PUL DIR	PUL DIR 低	PUL DIR 高
	2	CW+CCW	PUL(CW) DIR(CCW)	CW CCW / CW CCW	CW CCW / CW CCW
	3	A phase + B phase Quadrature pulse 4 times frequency	PUL (A phase) DIR (B phase)	A相 B相 A相超前B相90°	A相 B相 B相超前A相90°
1	0	Pulse + direction Positive logic	PUL DIR	PUL DIR 低	PUL DIR 高
	1	Pulse + direction Negative logic	PUL DIR	PUL DIR 高	PUL DIR 低
	2	CW+CCW	PUL（CW） DIR（CCW）	CW CCW / CW CCW	CW CCW / CW CCW
	3	A phase + B phase Quadrature pulse 4 times frequency	PUL (A phase) DIR (B phase)	A相 B相 B相超前A相90°	A相 B相 A相超前B相90°

P03.04	Name	Position command average filter time constant		Related mode	-
	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	-
	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	Name	Number of position commands for one motor rotation		Related mode	-
P03.07	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	Name	Electronic gear ratio numerator 1		Related mode	P
P03.09	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	Name	Electronic gear ratio denominator 1		Related mode	P
P03.11	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	Name	Electronic gear ratio numerator 2		Related mode	P
P03.13	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	Name	Electronic gear ratio denominator 2		Related mode	P
P03.15	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
	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	Unit of positioning completion threshold		Related mode	P
	Range	0～1	Unit -	Factory setting	1

The unit used to set the value of the positioning completion threshold P03.22 (the default value is different under each drive model, the default value is 0 under EtherCAT/CANopen, and the default value is 1 under the pulse model).

0: Command unit

1: Encoder unit

P03.22	Name	Positioning completion threshold		Related mode	P
	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
	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
	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
	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	-
	Range	-	Unit	-	Factory setting	-

P03.28 P03.29	Name	Step operation			Related mode	P
	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
	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
	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
	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
	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
	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
	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
	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 of the zero switch signal		Related mode	P
	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	-
	Range	-	Unit	-	Factory setting	-

P03.46 P03.47	Name	Mechanical origin offset		Related mode	P
	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
	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
	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
	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
	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
	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
	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
	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
	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
	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.**

Group P04：Speed control parameters

P04.00	Name	Speed command source selection		Related mode	S
	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
	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
	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
	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
	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
	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
	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	-
	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	-
	Range	-	Unit	-	Factory setting	-

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

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

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

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

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

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

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

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

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

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

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

P04.63	Name	Communication control acceleration time constant			Related mode	S
	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

	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
	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
	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
	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	-
	Range	0～3000	Unit	rpm	Factory setting	100

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

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

P04.71	Name	Open loop operation torque			Related mode	-
	Range	1～100	Unit	%	Factory setting	50

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

P04.74	Name	Lock shaft torque			Related mode	-
	Range	0～65535	Unit	%	Factory setting	50

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

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

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

P04.78	Name	Encoder calibration deceleration			Related mode	-
	Range	1～10	Unit	r/s^2	Factory setting	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	%	Factory setting	85

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

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

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

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

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

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

Group P06：Gain parameters

P06.00	Name	First velocity loop gain			Related mode	-
	Range	0～65535	Unit	0.1Hz	Factory setting	4500

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

In position mode, if you increase the position gain, you need to increase the speed gain at the same time.

P06.01	Name	First velocity loop integral			Related mode	-
	Range	1～30000	Unit	0.1ms	Factory setting	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	First position loop gain			Related mode	-
	Range	0～5000	Unit	0.1Hz	Factory setting	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	Second velocity loop gain			Related mode	-
	Range	0～65535	Unit	0.1Hz	Factory setting	4500

P06.04	Name	Second velocity loop integral			Related mode	-
	Range	1～30000	Unit	0.1ms	Factory setting	3500

P06.05	Name	Second position loop gain			Related mode	-
	Range	0～5000	Unit	0.1Hz	Factory setting	500

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

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

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

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

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

P06.14	Name	Velocity feedforward low-pass filter cut-off frequency			Related mode	-
	Range	1～10000	Unit	Hz	Factory setting	2000

Set the filter cut-off frequency of the speed feedforward.

P06.15	Name	Velocity feedforward gain			Related mode	-
	Range	1～1000	Unit	0.1%	Factory setting	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	Factory setting	2000

Set the filter frequency of the torque feedforward.

P06.17	Name	Torque feedforward gain			Related mode	-
	Range	0～1000	Unit	0.1%	Factory setting	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	Reserve			Related mode	-
	Range	-	Unit	-	Factory setting	-

P06.19	Name	Velocity low pass filter cut-off frequency 1			Related mode	-
	Range	1～10000	Unit	Hz	Factory setting	1000

Set the cutoff 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	Velocity low pass filter cut-off frequency 2			Related mode	-
	Range	1～10000	Unit	Hz	Factory setting	2000

P06.21	Name	Reserve			Related mode	-
	Range	-	Unit	-	Factory setting	-

P06.24	Name	Torque command low-pass filter cut-off frequency 1			Related mode	-
	Range	1～10000	Unit	Hz	Factory setting	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	Reserve			Related mode	-
	Range	-	Unit	-	Factory setting	-

P06.26	Name	Torque feedback low-pass filter cut-off frequency 1			Related mode	-
	Range	1～10000	Unit	Hz	Factory setting	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	Reserve			Related mode	-
	Range	-	Unit	-	Factory setting	-

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

P06.29	Name	Current loop integral time constant			Related mode	-
	Range	1～10000	Unit	0.1ms	Factory setting	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, it is easy to cause oscillation or noise. When the set value is 10000, the integrator does not work.

P06.30	Name	PVIA algorithm proportional gain Kp			Related mode	-
	Range	0～50000	Unit	-	Factory setting	3000

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

P06.32	Name	PVIA algorithm speed gain Kv1			Related mode	-
	Range	0～50000	Unit	-	Factory setting	1000

P06.33	Name	PVIA algorithm speed gain Kv2			Related mode	-
	Range	0～50000	Unit	-	Factory setting	100

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

P06.35	Name	PVIA algorithm speed gain Kvff			Related mode	-
	Range	0～50000	Unit	-	Factory setting	1000

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

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

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

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

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

P06.45	Name	Reserve			Related mode	-
	Range	-	Unit	-	Factory setting	-

P06.46	Name	Reserve			Related mode	-
	Range	-	Unit	-	Factory setting	-

P06.47	Name	Reserve			Related mode	-
	Range	-	Unit	-	Factory setting	-

P06.48	Name	Reserve		Related mode	-
	Range	-	Unit	-	Factory setting	-

P06.49	Name	Reserve		Related mode	-
	Range	-	Unit	-	Factory setting	-

P06.50	Name	Reserve		Related mode	-
	Range	-	Unit	-	Factory setting	-

P06.51	Name	Reserve		Related mode	-
	Range	-	Unit	-	Factory setting	-

P06.52	Name	Reserve		Related mode	-
	Range	-	Unit	-	Factory setting	-

P06.53	Name	Reserve		Related mode	-
	Range	-	Unit	-	Factory setting	-

Group P08：Communication parameters

P08.00	Name	RS485 address		Related mode	-
	Range	1～247	Unit	-	Factory setting	1

Set the servo drive axis address.

0: Broadcast address. The host device can write to all servo drives through the broadcast address. The drive performs corresponding operations according to the broadcast data frame, but does not respond.

1～247: When multiple servo drives are networked, each servo drive can only have a unique address, otherwise it will cause abnormal communication or communication failure.

P08.01	Name	RS485 Baud rate setting		Related mode	-
	Range	0～5	Unit	-	Factory setting	5

Set the communication baud rate between the servo drive and the upper computer device. The communication baud rate of the servo drive must be the same as the communication baud rate of the upper computer device, otherwise the communication will not be possible.

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 data format		Related mode	-
	Range	0～5	Unit	-	Factory setting	0

Set the data format when the servo drive communicates with the upper computer device. The data format of the servo drive must be consistent with that of the upper computer device, otherwise communication will not be possible.

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 Address		Related mode	-
	Range	1～127	Unit	-	Factory setting	2

Set the CAN communication address of the servo drive.

1～127: When multiple servo drives are networked, each servo drive can only have a unique address, otherwise it will cause abnormal communication or communication failure.

P08.06	Name	CAN Baud rate setting		Related mode	-
	Range	0～6	Unit	-	Factory setting	4

Set the communication baud rate between the servo drive and the upper computer device. The communication baud rate of the servo drive must be the same as the communication baud rate of the upper computer device, otherwise the communication will not be possible.

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 Time Out		Related mode	-
	Range	0～65535	Unit	ms	Factory setting	0

Set the CAN communication interruption detection time. The basis is that if the CANopen synchronization signal is not received within the set time, the CAN communication disconnection fault will be reported.

0: Do not enable the disconnection detection function

Other values: delay time for disconnection detection

P08.08	Name	EtherCAT address		Related mode	-
	Range	Display	Unit	-	Factory setting	-

P08.09	Name	Alias address		Related mode	-
	Range	Display	Unit	-	Factory setting	-

P08.10	Name	EtherCAT Address Setting		Related mode	-
	Range	0～65535	Unit	-	Factory setting	0

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

0: Do not assign the site address manually, the site address is assigned by the host or written into the EEPROM

Other values: Manually assign a station address. After the drive is powered on and initialized, the value of P08.08 will be consistent with the set value.

Note: This operation is only a write operation to the site alias register of the ESC slave controller chip of EtherCAT. As to whether the site address is actually enabled as the addressing address of the servo drive, the host needs to perform corresponding operations.

P08.30	Name	RS232 address		Related mode	-
	Range	-	Unit	-	Factory setting	1

P08.31	Name	RS232 Baud rate setting		Related mode	-
	Range	0～5	Unit	-	Factory setting	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 data format		Related mode	-
	Range	0～5	Unit	-	Factory setting	0

Set the RS232 communication data format. For the setting method, please refer to parameter P08.02 (RS485 communication data format selection).

Group P05：Torque control parameters

P05.00	Name	Torque Command Source A		Related mode	T
	Range	0～2	Unit	-	Factory setting	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	-	Factory setting	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	-	Factory setting	0

Set the command source of torque command source B.

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 Set Value From Panel		Related mode	T
	Range	-3000～3000	Unit	0.1%	Factory setting	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	Max Torque Limit		Related mode	T
	Range	0～3000	Unit	0.1%	Factory setting	3000

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

P05.05	Name	Torque Profile Slop		Related mode	T
	Range	1～65535	Unit	0.1%/s	Factory setting	3000

Set the increment of the torque command. The setting value 3000 means that the torque command will increase 300% of the rated torque evenly within 1s.

P05.06	Name	Torque Limit Source (Reserve)		Related mode	T
	Range	0～4	Unit	-	Factory setting	0

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

P05.08	Name	Inside Pos Torque Limit (Reserve)		Related mode	T
	Range	0～3000	Unit	0.1%	Factory setting	3000

P05.09	Name	Inside Neg Torque Limit (Reserve)		Related mode	T
	Range	0～3000	Unit	0.1%	Factory setting	3000

P05.10	Name	Outside Pos Torque Limit (Reserve)			Related mode	T
	Range	0～3000	Unit	0.1%	Factory setting	3000

P05.11	Name	Outside Neg Torque Limit (Reserve)			Related mode	T
	Range	0～3000	Unit	0.1%	Factory setting	3000

P05.12	Name	Speed Limit Source			Related mode	T
	Range	0～1	Unit	-	Factory setting	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	-	Factory setting	0

P05.14	Name	Inside Pos Speed Limit			Related mode	T
	Range	0～6000	Unit	rpm	Factory setting	3000

Set the forward speed limit value in torque control mode.

P05.15	Name	Inside Neg Speed Limit			Related mode	T
	Range	0～6000	Unit	rpm	Factory setting	3000

Set the reverse speed limit value in torque control mode.

P05.16	Name	Torque Arrive Base value			Related mode	T
	Range	0～65535	Unit	0.1%	Factory setting	0

P05.17	Name	Torque Arrive Valid value			Related mode	T
	Range	0～65535	Unit	0.1%	Factory setting	100

P05.18	Name	Torque Arrive Invalid value			Related mode	T
	Range	0～65535	Unit	0.1%	Factory setting	50

P05.19	Name	Torque Arrive Output Time			Related mode	T
	Range	0～65535	Unit	ms	Factory setting	50

P05.20	Name	Torque Cmd from Communication			Related mode	T
	Range	0～3000	Unit	0.1%	Factory setting	200

P05.21	Name	Acc Time			Related mode	T
	Range	1～65535	Unit	ms	Factory setting	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	Dec Time			Related mode	T
	Range	1～65535	Unit	ms	Factory setting	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	Factory setting	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 operating state after the torque continues to maintain the set time

P05.24	Name	Operation mode after torque is reached			Related mode	T
	Range	0～3	Unit	-	Factory setting	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	-	Factory setting	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	-	Factory setting	0

P05.33	Name	Torque limit detection time (Reserve)			Related mode	T
	Range	0～65535	Unit	-	Factory setting	0

P05.34	Name	Reserve			Related mode	T
	Range	-	Unit	-	Factory setting	-

P05.35	Name	Reserve			Related mode	T
	Range	-	Unit	-	Factory setting	-

P05.36	Name	Reserve			Related mode	T
	Range	-	Unit	-	Factory setting	-

P05.37	Name	Reserve			Related mode	T
	Range	-	Unit	-	Factory setting	-

Group P09：Multi-segment position parameters

P09.00	Name	Multi-segment position operation mode			Related mode	P
	Range	0～2	Unit	-	Factory setting	1

In the position control mode, when the position command source is set to multi-segment position command (P03.00=2), the multi-segment position operation mode is set.

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;
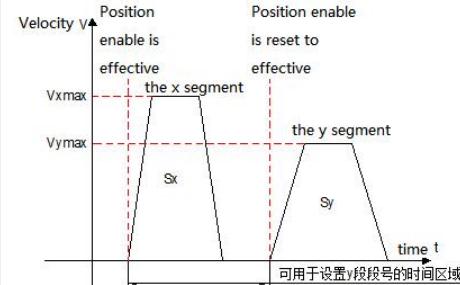
P09.01	Name	End points of position		Related mode	P
	Range	1～16	Unit	-	Factory setting	1

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 CMD4	FunIN.16 CMD3	FunIN.15 CMD2	FunIN.14 CMD1	segment number
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 units		Related mode	P
	Range	0～1	Unit	-	Factory setting	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	-	Factory setting	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	Displacement in section 1		Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	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	Speed in section 1		Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	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	Acc and Dec time in section 1			Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

In the first stage of multi-stage position, the time of the motor from 0rpm uniform speed to 1000rpm.

P09.16	Name	Wait time in section 1			Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	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	Displacement in section 2			Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.19	Name	Speed in section 2			Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.20	Name	Acc and Dec time in section 2			Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.21	Name	Wait time in section 2			Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.22 P09.23	Name	Displacement in section 3			Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.24	Name	Speed in section 3			Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.25	Name	Acc and Dec time in section 3			Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.26	Name	Wait time in section 3			Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.27 P09.28	Name	Displacement in section 4			Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.29	Name	Speed in section 4			Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.30	Name	Acc and Dec time in section 4			Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.31	Name	Wait time in section 4			Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.32 P09.33	Name	Displacement in section 5			Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.34	Name	Speed in section 5			Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.35	Name	Acc and Dec time in section 5			Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.36	Name	Wait time in section 5			Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.37 P09.38	Name	Displacement in section 6			Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.39	Name	Speed in section 6			Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.40	Name	Acc and Dec time in section 6			Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.41	Name	Wait time in section 6			Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.42 P09.43	Name	Displacement in section 7			Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.44	Name	Speed in section 7			Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.45	Name	Acc and Dec time in section 7			Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.46	Name	Wait time in section 7			Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.47 P09.48	Name	Displacement in section 8			Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.49	Name	Speed in section 8			Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.50	Name	Acc and Dec time in section 8			Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.51	Name	Wait time in section 8			Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.52 P09.53	Name	Displacement in section 9			Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.54	Name	Speed in section 9			Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.55	Name	Acc and Dec time in section 9			Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.56	Name	Wait time in section 9			Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.57 P09.58	Name	Displacement in section 10			Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.59	Name	Speed in section 10			Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.60	Name	Acc and Dec time in section 10			Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.61	Name	Wait time in section 10			Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.62 P09.63	Name	Displacement in section 11			Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.64	Name	Speed in section 11			Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.65	Name	Acc and Dec time in section 11			Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.66	Name	Wait time in section 11			Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.67 P09.68	Name	Displacement in section 12			Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.69	Name	Speed in section 12			Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.70	Name	Acc and Dec time in section 12			Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.71	Name	Wait time in section 12			Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.72 P09.73	Name	Displacement in section 13			Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.74	Name	Speed in section 13			Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.75	Name	Acc and Dec time in section 13			Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.76	Name	Wait time in section 13		Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.77 P09.78	Name	Displacement in section 14		Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.79	Name	Speed in section 14		Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.80	Name	Acc and Dec time in section 14		Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.81	Name	Wait time in section 14		Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.82 P09.83	Name	Displacement in section 15		Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.84	Name	Speed in section 15		Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.85	Name	Acc and Dec time in section 15		Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.86	Name	Wait time in section 15		Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

P09.87 P09.88	Name	Displacement in section 16		Related mode	P
	Range	-1073741824～1073741824	Unit	Command unit	Factory setting	10000

P09.89	Name	Speed in section 16		Related mode	P
	Range	1～6000	Unit	rpm	Factory setting	200

P09.90	Name	Acc and Dec time in section 16		Related mode	P
	Range	1～65535	Unit	ms	Factory setting	100

P09.91	Name	Wait time in section 16		Related mode	P
	Range	0～65535	Unit	ms(s)	Factory setting	100

Group P10：Multi-segment speed parameters

P10.00	Name	Multi-segment speed command running mode		Related mode	S
	Range	0～2	Unit	-	Factory setting	1

(P10.00 — Range: 0～2; Unit: -; Factory setting: 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.
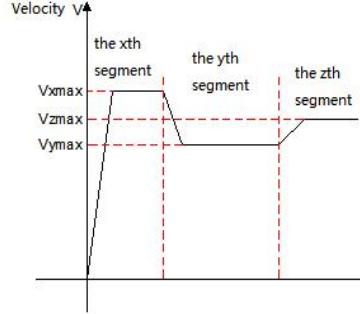
During the operation of each speed command, the servo enable must be ensured, otherwise, the servo driver will stop.

P10.01	Name	End poiont of speed command		Related mode	S
	Range	1～16	Unit -	Factory setting	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 -	Factory setting	0

Set multi-segment speed running time unit.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

P10.20	Name	Section 1 speed command		Related mode	S
	Range	-6000～6000	Unit	rpm	Factory setting	100

P10.21	Name	Section 1 speed command running time		Related mode	S
	Range	0～65535	Unit	0.1sec/0.1min	Factory setting	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	Section 1 Acc/Dec time selection		Related mode	S
	Range	1～7	Unit	-	Factory setting	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;

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

$$t_3 = \frac{|V_2 - V_1|}{1000} \times The\ acceleration\ time\ set\ in\ the\ second\ segment$$
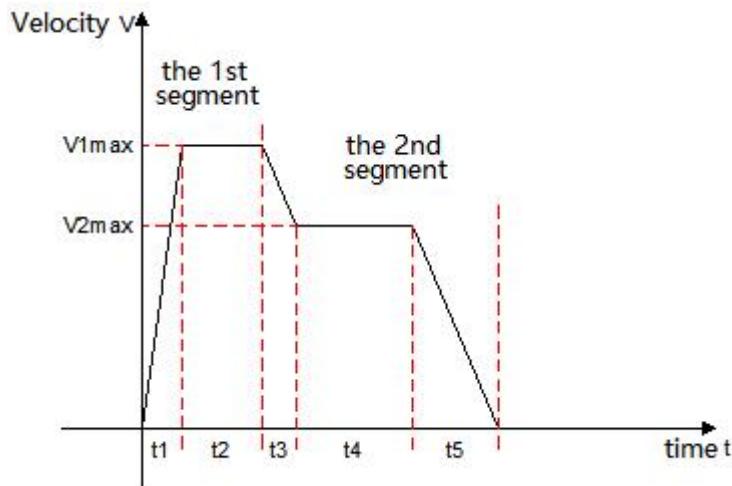
P10.23	Name	Section 2 speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Factory setting	200

P10.24	Name	Section 2 speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec 0.1min	Factory setting	20

P10.25	Name	Section 2 Acc/Dec time selection			Related mode	S
	Range	1~7	Unit	-	Factory setting	1

P10.26	Name	Section 3 speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Factory setting	300

P10.27	Name	Section 3 speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec 0.1min	Factory setting	30

P10.28	Name	Section 3 Acc/Dec time selection			Related mode	S
	Range	1~7	Unit	-	Factory setting	1

P10.29	Name	Section 4 speed command			Related mode	S
	Range	-6000~6000	Unit	rpm	Factory setting	400

P10.30	Name	Section 4 speed command running time			Related mode	S
	Range	0~65535	Unit	0.1sec 0.1min	Factory setting	40

P10.31	Name	Section 4 Acc/Dec time selection			Related mode	S
	Range	1～7	Unit	-	Factory setting	1

P10.32	Name	Section 5 speed command			Related mode	S
	Range	-6000～6000	Unit	rpm	Factory setting	500

P10.33	Name	Section 5 speed command running time			Related mode	S
	Range	0～65535	Unit	0.1sec 0.1min	Factory setting	50

P10.34	Name	Section 5 Acc/Dec time selection			Related mode	S
	Range	1～7	Unit	-	Factory setting	1

P10.35	Name	Section 6 speed command			Related mode	S
	Range	-6000～6000	Unit	rpm	Factory setting	600

P10.36	Name	Section 6 speed command running time			Related mode	S
	Range	0～65535	Unit	0.1sec 0.1min	Factory setting	60

P10.37	Name	Section 6 Acc/Dec time selection			Related mode	S
	Range	1～7	Unit	-	Factory setting	1

P10.38	Name	Section 7 speed command			Related mode	S
	Range	-6000～6000	Unit	rpm	Factory setting	700

P10.39	Name	Section 7 speed command running time			Related mode	S
	Range	0～65535	Unit	0.1sec 0.1min	Factory setting	70

P10.40	Name	Section 7 Acc/Dec time selection			Related mode	S
	Range	1～7	Unit	-	Factory setting	1

P10.41	Name	Section 8 speed command			Related mode	S
	Range	-6000～6000	Unit	rpm	Factory setting	800

P10.42	Name	Section 8 speed command running time			Related mode	S
	Range	0～65535	Unit	0.1sec 0.1min	Factory setting	80

P10.43	Name	Section 8 Acc/Dec time selection			Related mode	S
	Range	1～7	Unit	-	Factory setting	1

P10.44	Name	Section 9 speed command			Related mode	S
	Range	-6000～6000	Unit	rpm	Factory setting	900

P10.45	Name	Section 9 speed command running time			Related mode	S
	Range	0～65535	Unit	0.1sec 0.1min	Factory setting	90

P10.46	Name	Section 9 Acc/Dec time selection			Related mode	S
	Range	1～7	Unit	-	Factory setting	1

10.47	Name	Section 10 speed command			Related mode	S
	Range	-6000～6000	Unit	rpm	Factory setting	1000

P10.48	Name	Section 10 speed command running time			Related mode	S
	Range	0～65535	Unit	0.1sec 0.1min	Factory setting	100

P10.49	Name	Section 10 Acc/Dec time selection			Related mode	S
	Range	1～7	Unit	-	Factory setting	1

P10.50	Name	Section 11 speed command			Related mode	S
	Range	-6000～6000	Unit	rpm	Factory setting	1100

P10.51	Name	Section 11 speed command running time			Related mode	S
	Range	0～65535	Unit	0.1sec 0.1min	Factory setting	110

P10.52	Name	Section 11 Acc/Dec time selection			Related mode	S
	Range	1～7	Unit	-	Factory setting	1

P10.53	Name	Section 12 speed command			Related mode	S
	Range	-6000～6000	Unit	rpm	Factory setting	1200

P10.54	Name	Section 12 speed command running time			Related mode	S
	Range	0～65535	Unit	0.1sec 0.1min	Factory setting	120

P10.55	Name	Section 12 Acc/Dec time selection			Related mode	S
	Range	1～7	Unit	-	Factory setting	1

P10.56	Name	Section 13 speed command			Related mode	S
	Range	-6000～6000	Unit	rpm	Factory setting	1300

P10.57	Name	Section 13 speed command running time			Related mode	S
	Range	0～65535	Unit	0.1sec 0.1min	Factory setting	130

P10.58	Name	Section 13 Acc/Dec time selection			Related mode	S
	Range	1～7	Unit	-	Factory setting	1

P10.59	Name	Section 14 speed command			Related mode	S
	Range	-6000～6000	Unit	rpm	Factory setting	1400

P10.60	Name	Section 14 speed command running time			Related mode	S
	Range	0～65535	Unit	0.1sec 0.1min	Factory setting	140

P10.61	Name	Section 14 Acc/Dec time selection			Related mode	S
	Range	1～7	Unit	-	Factory setting	1

P10.62	Name	Section 15 speed command			Related mode	S
	Range	-6000～6000	Unit	rpm	Factory setting	1500

P10.63	Name	Section 15 speed command running time			Related mode	S
	Range	0～65535	Unit	0.1sec 0.1min	Factory setting	150

P10.64	Name	Section 15 Acc/Dec time selection			Related mode	S
	Range	1～7	Unit	-	Factory setting	1

P10.65	Name	Section 16 speed command			Related mode	S
	Range	-6000～6000	Unit	rpm	Factory setting	1600

P10.66	Name	Section 16 speed command running time			Related mode	S
	Range	0～65535	Unit	0.1sec 0.1min	Factory setting	160

P10.67	Name	Section 16 Acc/Dec time selection			Related mode	S
	Range	1～7	Unit	-	Factory setting	1

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	-	Factory setting	-

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

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

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

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

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

P11.06	Name	0x605E(Failure shutdown mode selection)			Related mode	-
	Range	-	Unit	-	Factory setting	-

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

P11.08	Name	0x6061(Operation mode display)			Related mode	-
	Range	-	Unit	-	Factory setting	-

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

P11.11 P11.12	Name	0x6063(Position feedback)			Related mode	-
	Range	-	Unit	Encoder unit	Factory setting	-

P11.13 P11.14	Name	0x6064(Position feedback)			Related mode	-
	Range	-	Unit	Command unit	Factory setting	-

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

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

P11.18 P11.19	Name	0x6067(Position reaching threshold)			Related mode	-
	Range	-	Unit	-	Factory setting	-

P11.20	Name	0x6068(Position arrival time window)			Related mode	-
	Range	-	Unit	ms	Factory setting	-

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

P11.23	Name	0x606D(Speed reaching threshold)			Related mode	-
	Range	-	Unit	rpm	Factory setting	-

P11.24	Name	0x606E(Speed arrival time window)			Related mode	-
	Range	-	Unit	ms	Factory setting	-

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

P11.49 P11.50	Name	0x6087(Torque ramp)		Related mode	-
	Range	-	Unit	0.1%/s	Factory setting	-

P11.51 P11.52	Name	0x6091_1(Gear ratio numerator/motor resolution)		Related mode	-
	Range	-	Unit	-	Factory setting	-

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

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

P11.56 P11.57	Name	0x6099_1 (Search homing signal speed)			Related mode	-
	Range	-	Unit	Command unit/s	Factory setting	-

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

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

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

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

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

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

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

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

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

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

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

P11.77	Name	0x60D5(Probe 1 rising edge counter)		Related mode	-
	Range	-	Unit	-	Factory setting	-

P11.78	Name	0x60D6(Probe 1 falling edge counter)		Related mode	-
	Range	-	Unit	-	Factory setting	-

P11.79	Name	0x60D7(Probe 2 rising edge counter)		Related mode	-
	Range	-	Unit	-	Factory setting	-

P11.80	Name	0x60D8(Probe 2 falling edge counter)		Related mode	-
	Range	-	Unit	-	Factory setting	-

P11.81	Name	0x60E0 (Maximum forward torque limit)		Related mode	-
	Range	-	Unit	0.1%	Factory setting	-

P11.82	Name	0x60E1(Maximum negative torque limit)		Related mode	-
	Range	-	Unit	0.1%	Factory setting	-

P11.83 P11.84	Name	0x60F4(Position deviation)		Related mode	-
	Range	-	Unit	Command unit	Factory setting	-

P11.85 P11.86	Name	0x60FC(Position command)		Related mode	-
	Range	-	Unit	Command unit	Factory setting	-

P11.87 P11.88	Name	0x60FD (Digital input)		Related mode	-
	Range	-	Unit	-	Factory setting	-

P11.89 P11.90	Name	0x60FE_1(Physical output enable)		Related mode	-
	Range	-	Unit	-	Factory setting	-

P11.91 P11.92	Name	0x60FE_2(Physical output status)		Related mode	-
	Range	-	Unit	-	Factory setting	-

P11.93 P11.94	Name	0x60FF(Target speed)		Related mode	-
	Range	-	Unit	Command unit/s	Factory setting	-

P11.95 P11.96	Name	0x6502(Supported servo operation mode)		Related mode	-
	Range	-	Unit	-	Factory setting	-

Group P12：Auxiliary function

P12.00	Name	Save parameters to the EEPROM of the drive		Related mode	-
	Range	0～1	Unit	-	Factory setting	0

P12.01	Name	Read parameters from the EEPROM of the drive		Related mode	-
	Range	0～1	Unit	-	Factory setting	0

P12.02	Name	Restore factory default parameter values		Related mode	-
	Range	0～1	Unit	-	Factory setting	0

P12.03	Name	Reset driver failure		Related mode	-
	Range	0～1	Unit	-	Factory setting	0

P12.04	Name	Reserved		Related mode	-
	Range	-	Unit	-	Factory setting	-

P12.05	Name	Reset the encoder multi-turn value		Related mode	-
	Range	0～1	Unit	-	Factory setting	0

P12.06	Name	Reset the encoder multi-turn value and fault		Related mode	-
	Range	0～1	Unit	-	Factory setting	0

P12.07	Name	Reset drive		Related mode	-
	Range	-	Unit	-	Factory setting	-

P12.08	Name	Reset fault record		Related mode	-
	Range	0～1	Unit	-	Factory setting	0

P12.09	Name	Communication control operation position command type		Related mode	PS
	Range	0～1	Unit	-	Factory setting	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	Factory setting	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	-	Factory setting	-

P12.12	Name	Communication control demonstration operation delay time		Related mode	PS
	Range	0～65535	Unit	ms	Factory setting	100

P12.13	Name	Communication control demonstration operation start/stop command		Related mode	PS
	Range	0～2	Unit	-	Factory setting	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	-	Factory setting	0

P12.15	Name	Reserved			Related mode	-
	Range	-	Unit	-	Factory setting	-

P12.16	Name	Data sampling channel 1			Related mode	-
	Range	0～65535	Unit	-	Factory setting	0

P12.17	Name	Data sampling channel 2			Related mode	-
	Range	0～655	Unit	-	Factory setting	0

P12.18	Name	Data sampling interval			Related mode	-
	Range	0～65535	Unit	0.1ms	Factory setting	0

P12.19	Name	Data sampling start flag			Related mode	-
	Range	0～1	Unit	-	Factory setting	0

P12.20	Name	Save motor related parameters to encoder EEPROM			Related mode	-
	Range	0～2	Unit	-	Factory setting	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	-	Factory setting	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

Group P13：Monitoring parameter groups

P13.00	Name	Running status			Related mode	-
	Range	-	Unit	-	Factory setting	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	Factory setting	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	Factory setting	Display

Display the current speed command value of the servo drive, after rounding the display, the accuracy is 1rpm.

P13.03	Name	Mortor torque			Related mode	-
	Range	-	Unit	%	Factory setting	Display

Display actual servo motor torque, 100% corresponding to 1 times motor rated torque.

P13.04	Name	Torque command			Related mode	-
	Range	-	Unit	%	Factory setting	Display

Display the current torque command value of the servo driver, 100% corresponding to 1 times the motor rated torque.

P13.05	Name	Running current			Related mode	-
	Range	-	Unit	%	Factory setting	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	Factory setting	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	Factory setting	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	Factory setting	Display

Used to count the number of encoder feedback pulses since the last reset. P13.11 and P13.12 are combined into a 32-bit value, where P13.11 is the low 16-bit value, and P13.12 is the high 16-bit value. Subsequent use P13.11 to represent the 32-bit parameter.

P13.13 P13.14	Name	Position deviation counter			Related mode	-
	Range	-	Unit	Command unit	Factory setting	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	Factory setting	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	Factory setting	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	Factory setting	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	-	Factory setting	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	-	Factory setting	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	Factory setting	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	Factory setting	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	Factory setting	Display

P13.25 P13.26	Name	Encoder status register		Related mode	-
	Range	-	Unit	-	Factory setting	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	Factory setting	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	Factory setting	Display

DRV series servo drivers are not available.

P13.30 P13.31	Name	Current position of the motor			Related mode	-
	Range	-	Unit	Command unit	Factory setting	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	Factory setting	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	Error code			Related mode	-
	Range	-	Unit	-	Factory setting	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	Factory setting	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	Turn	Factory setting	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.						