DC integrated torque servo

YZ-AIM-CanOpen_v1_2

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1. Product features

1. Isolate CANOPEN communication and comply with CiA301 V4.2.0 specification.
   A. Support SDO, TPDO, RPDO.
   B. Support speed mode, position mode (contour mode, interpolation mode).
   C. Support heartbeat production and consumption
2. 15-bit absolute encoder, pulse up to 32768 per revolution.
3. Multi-turn absolute value (battery required). Pulse mode: automatically return to the power-off position after power-on again.
   Communication mode: power off and record location.
4. Multi-stage DD motor structure, large torque output.
5. Integrated servo, simplified wiring, ultra-small size.
6. Low noise, low vibration, high-speed positioning, high reliability.
7. FOC field-oriented vector control, support position/speed closed loop.
8. It can work in the zero lag given pulse state and follow the zero lag.
9. 16-bit electronic gear function.
10. Provide CANOPEN host computer, which can monitor motor status and modify parameters.
11. Position mode, support pulse + direction signal, encoder follow
12. Speed mode, support PWM duty cycle signal speed regulation
13. With locked-rotor, over-current protection and over-voltage protection.

Second, the parameter table

Model parameter		42AIM15C	42AIM10C
power supply	Voltage	24VDC±10%	24VDC±10%
	Current	2.2A	1.6A
Motor parameters	Torque	0.48NM	0.33NM
	Rated speed	1000RPM	1000RPM
	Maximum speed	1500RPM	1500RPM
	power	50W	35W
Feedback signal		Single-turn 15-bit magnetic encoder (single-turn 32768 pulses)	
cooling method		Natural cooling	
weight			
Position control mode	**Maximum input pulse frequency**	500KHz	
	Pulse command mode	Pulse + direction, A phase + B phase	
	Electronic gear ratio	Setting range: 1~65535 than 1~65535	
	Location sampling frequency	2KHz	
Protective function		Locked-rotor alarm	
Communication Interface		canopen (CAN communication, rate 1M)	
Use environment	**Ambient temperature**	0~40°	
	Maximum allowable motor temperature	85°	
	humidity	5~95%	

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Model parameter	57AIM15C	57AIM15CH	57AIM30C	57AIM30CH

power supply	Voltage	24~36VDC	24~36VDC	24~36VDC	24~36VDC
	Current	2.2A	2.2A	4.4A	4.4A
Motor parameters	Torque	0.48NM	0.24NM	0.96NM	0.48NM
	Rated speed	1000RPM	2000RPM	1000RPM	2000RPM
	Maximum speed	1500RPM	2500RPM	1500RPM	2500RPM
	power	50W	50W	100W	100W
Feedback signal		Multi-turn absolute encoder (single-turn 32768 pulses, single-turn 15 bits)			
cooling method		Natural cooling			
weight					
Position control mode	**Maximum input pulse frequency**	500KHz			
	Pulse command mode	Pulse + direction, A phase + B phase			
	Electronic gear ratio	Setting range: 1~65535 than 1~65535			
	Location sampling frequency	2KHz			
Protective function		Locked-rotor alarm			
Communication Interface		Easycan (CAN communication, rate 1M)			
		Serial port TTL (19200,8,N,1) (monitor motor status and modify parameters).			
Use environment	**Ambient temperature**	0~40°			
	Maximum allowable motor temperature	85°			
	humidity	5~95%			

Model parameter		60AIM25C	60AIM25CH
power supply	Voltage	36VDC±10%	36VDC±10%
	Current	7A	7A
Motor parameters	Torque	2NM	1NM
	Rated speed	1000RPM	2000RPM
	Maximum speed	1500RPM	2500RPM
	power	200W	200W
Feedback signal		Single-turn 15-bit magnetic encoder (single-turn 32768 pulses)	
cooling method		Natural cooling	
weight			
Position control mode	**Maximum input pulse frequency**	500KHz	
	Pulse command mode	Pulse + direction, A phase + B phase	
	Electronic gear ratio	Setting range: 1~65535 than 1~65535	
	Location sampling frequency	2KHz	

Protective function		Locked-rotor alarm
Communication Interface		Easycan (CAN communication, rate 1M)
		Serial port TTL (19200,8,N,1) (monitor motor status and modify parameters).
Use environment	**Ambient temperature**	0~40°
	Maximum allowable motor temperature	85°
	humidity	5~95%

two. Drive interface

1. Power and control signal interface

Terminal number	name	Function
1	+24V	The positive pole of the DC power supply, +24V. Reverse connection of positive and negative will directly short-circuit the power supply and may also damage the drive
2	GND	DC power ground. Reverse connection of positive and negative will directly short-circuit the power supply and may also damage the drive

3	PU+ (+5V)	Pulse control signal: the rising edge of the pulse is valid; when PU- is high level, 3.3~5V, when low level is 0~0.5V.
4	PU- (PU)	In order to reliably respond to pulse signals, the pulse width should be greater than 1.2μs. If +12V or +24V is used, a series resistor is required.
5	DIR+ (+5V)	Direction signal: high/low level signal, in order to ensure the reliable commutation of the motor, the direction signal should be before the pulse signal
6	DIR- (DIR)	Set up at least 5μs. DIR-3.3 ~ 5V at high level, 0 ~ 0.5V at low level.

Terminal serial number: facing the terminal, the left is the first.

The AIM series adopts a differential interface circuit, which is suitable for differential signals, single-ended common cathode and common anode interfaces, built-in high-speed optocoupler, allows receiving long-line drivers, open collector a

The signal of the PNP output circuit.

2. Communication and output interface

Terminal serial number: facing the terminal, the lower row is 12345 from left to right, and the upper row is 6 7 8 9 10 from left to right.

Terminal number	name	Function
1	CANL	Can communication port, the use of CAN communication requires 5V power supply for CAN_5V, COM
2	NC	
3	NC	
4	CANH	Can communication port, the use of CAN communication requires 5V power supply for CAN_5V, COM
5	GND	Battery GND
6	COM	The output signal is the common ground with the 485 power supply.
7	WR	Alarm signal output, the internal is optocoupler NPN output. Normally, it is in high impedance state, and it is connected to COM when alarming.
8	BAT	3.7V lithium battery positive electrode. It is used to supply power to the encoder after power failure to realize the multi-turn absolute value function.
9	ZO	Multi-turn encoder zero output. Encoder position greater than 0: NPN outputs a conduction signal, encoder position less than 0: NPN does not conduct
10	CAN_5V	485 communication 5V power supply, external power supply is required. (This power supply is supplied by the controller)

3. Status indication and alarm

The red and green lights will be on once after powering on, which is used to check whether the LED is working normally. Then the green light is on and the red light is off as normal. If you encounter an alarm state, you can use the red

To determine the cause, the alarm code can also be read through modbus.

Alarm code	Flashing red	Alarm reason	Alarm handling
0x10	A long flash	Battery power down alarm	EN enables to send 1, or the control word to clear the alarm position 1, which can be restored. No shutdown, only prompt.
0x20	Two long flashes	Communication drop alarm	Resend the heartbeat packet to recover. The motor stops.
0x12	One long flash 2 short flash	Locked-rotor alarm	Downtime. EN enables to send 1, or the control word to clear the alarm position 1, which can be restored.
0x14	One long flash 4 short flashes	Stall alarm	Downtime. EN enables to send 1, or the control word to clear the alarm position 1, which can be restored.
0x15	One long flash 5 short flashes	Overvoltage alarm	If it exceeds 52V, it will alarm. If the boost is caused by power generation, a discharge module needs to be added.

Note: The locked-rotor alarm, the locked-rotor time can be set, see the register description for details.

3. Wiring diagram and control mode of the driver

1. Typical wiring diagram of the drive

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2. Command pulse + direction position control mode

Pulse command form	CCW	CW	Parameter setting value

Pulse train symbol	PUL DIR	Command pulse + direction

If you need 3200 pulses per revolution

The electronic gear is set to 32768 (number of pulses per revolution of encoder) / 3200 (need to set the number of pulses per revolution)

After the division is: 256 to 25

If you need 8192 pulses one revolution (default parameter)

The electronic gear is set to 32768 (number of pulses per revolution of encoder) / 8192 (the number of pulses in a circle that needs to be set)

After about the points: 32768 to 8192

After the division: 4 to 1

Note: It can be reduced as much as possible. The numerator of the electronic gear is 32768. If the value is too large, it will affect the following performance.

Command pulse frequency = (required motor speed/60) * number of pulses per revolution

For example: Need to click 1000RPM, the number of pulses per revolution is 8192

Pulse frequency = 1000/60 * 8192 = 136533HZ

3. Orthogonal command pulse position control mode

By setting the special function (address 0x19) to 2, after power-on again, it becomes the encoder follow mode. This mode can be used to follow the encoder, such as a shaft connected to the encoder,

Connect the encoder output to the drive (wiring mode is as the typical wiring diagram of the drive), the drive can control the servo motor, and follow the control encoder according to the signal input to the encoder.

The ratio of the rotation angle of the control encoder and the motor can be set by adjusting the electronic gear.

Forward pulse:

Reversal pulse:

The direction of motor rotation: PU rising edge leading DIR rising edge is forward rotation. The rising edge of PU lags behind the rising edge of DIR to be inverted.

Four, parameter debugging

According to the different load connected to the motor, the parameters need to be adjusted to achieve the best effect.

1. Internal acceleration and deceleration curve

Choose whether to use the internal acceleration/deceleration curve according to the different output signals of the controller.

Use internal acceleration curve:

When the motor acceleration is less than 60000, the drive will enable the internal acceleration/deceleration curve, and the specific acceleration will be the same as the set value.

Use occasion: Use the internal acceleration curve, it will produce the phenomenon of lagging pulse, some occasions do not need to follow in real time, you can use the internal acceleration curve. Some controllers, pulse

The frequency is directly given to the corresponding speed. If there is no acceleration or deceleration, the internal acceleration and deceleration curve is used, which can reduce the difficulty of controller programming.

Prohibit internal acceleration curve:

When the motor acceleration is greater than or equal to 60000, the drive allows acceleration and deceleration according to the external pulse, and the internal acceleration is invalid.

Use occasion: For example, the pulse output by the controller is accelerated and decelerated for the engraving machine, and there is no need for the acceleration curve inside the driver. If it is used at this time, it will lag behind the acti

The occasional pulse.

2. Screw load

First introduce the torque, first use a 400W motor, 1.3NM. The load is a screw with a pitch of 5mm, that is, the motor shaft rotates a circle and the load moves 5mm. In this case,

Load equivalent arm = 5mm / 3.14 = 1.592 mm

The thrust that the motor can provide is

Thrust through screw drive = 1.3NM / (1.592mm*0.001) = 816 N

The weight that can push the load is about 80KG, this is vertical, and the horizontal push can be slightly larger.

Since the moving distance of the screw load motor rotates a circle is short, so the parameters of the drive (acceleration can be larger, such as 20000, position loop KP can be larger, such as 3000). wait

Servicing motor is most suitable for this kind of load.

3. Pulley load

The servo motor is actually not very suitable for this kind of load. Because the pulley is generally larger in diameter, for example, 30mm in diameter. Then the motor rotates once, the distance the load moves is 30mm*

π = 94.2, which is many times larger than the 5mm screw rod mentioned above.

The thrust that the motor can provide is

Thrust through belt drive = 1.3NM / (30mm*0.001) = 43.3 N

The weight that can push the load is about 4.3KG. So the servo motor is actually not suitable for connecting the synchronous wheel, because the synchronous wheel rotates a circle and the load moves too long and the arm is long. If this

Servo motor should be used in such occasions. You can choose to directly connect the smallest synchronous wheel or connect the small synchronous wheel through the motor shaft, and connect the large synchronous wheel to the load end. T

Effect. In this case, the drive parameter (acceleration setting is small, such as 5000,), the purpose of setting the parameter in this way is to reduce the acceleration and deceleration, because the equivalent inertia of the load is large.

4. Disc load

This kind of load servo cannot be directly driven, and generally requires a reducer. For example, a disc with a diameter of 200mm and a weight of 10KG. The radius is 100mm, and the weight equivalent radius is

50mm. The force arm is great. If the servo needs to be connected to this kind of load, compare the reducer and then the load.

If the disc is not particularly heavy, it can be controlled by sacrificing some positioning accuracy and rigidity. The specific method is to set the motor acceleration to a relatively small value, for example, about 1000. Speed KI

Set to 2000 to cancel the integral effect. Change the position KP to 1000. The general disk load can also be used to change these parameters.

5. Automatic origin search function

The automatic origin search function is selected by changing the parameter of register address 0x19 (special function). If you need to find the origin automatically after power-on, the setting method is as follows:

modbus enable sending 1

Special function (address 0x19) sending 10~32768 (32768 corresponds to 360° of the motor)

Parameter save and send 1

It will automatically find the origin after power on again. Since it is an absolute encoder, it can automatically find any position in a circle after power-on. (DIR polarity is 1 or 0 can be set to find the origin

Point direction)

6. Automatically find the machine origin function

The function of automatically finding the machine origin can be selected by changing the parameter of register address 0x19 (special function). If you need to automatically find the mechanical origin after power-on, the setting metho

modbus enable sending 1

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Special function (address 0x19) send 1 (at this time, the machine origin will be found automatically)

Parameter save and send 1 (need to re-power on and automatically find the mechanical origin can be realized by saving this parameter)

After re-power on, it will automatically reverse until the motor is locked, and then the motor reverses 36° as the origin. (DIR polarity is 1 or 0, you can set the direction of finding the origin)

7. Clear position by communication method

Clear absolute position: If the absolute position needs to be cleared to 0 during operation, the numerator of the electronic gear sends 0 first (the electronic gear is invalid in the communication mode and is used for this special function
If the communication control can directly save the electronic gear molecule as 0), and then send 0 to the absolute position (0x16), then clear the absolute position directly to 0.

Emergency stop: In the communication mode, if there are a lot of pulses left and need to go, an emergency stop is needed. First, the numerator of the electronic gear sends 0 (the electronic gear is invalid in the communication mode ar
This special feature. If the communication control can directly save the numerator of the electronic gear as 0, and then send 0 at the incremental position (0x0C), it can be stopped in an emergency. There is also a small deceleration distance f
The speed distance is controlled by the position loop KP.

8. Default communication control after power-on

Just set the electronic gear numerator to 0, after saving, power on again, the modbus enable default is 1.

9. Instructions for the absolute value of multi-turns (with battery solution)

- A. Set the multi-turn position.

Before the motor is installed, connect the battery, power supply and communication cable to the motor. Use the host computer software to send 0 to the absolute position to let the motor go to the origin first. At this time, install the mc
It just corresponds to the origin of the system.

If the origin is not aligned during installation, the single-turn origin of the motor is the origin of the encoder and cannot be set. Multi-turns to zero can be cleared by turning off the power supply and battery at the same time.
Note: After the multi-turn absolute value function is used, the clear absolute position command cannot be used, because the clear absolute position command only clears the internal position register of the microcontroller, and cannot clear th
Multi-turn information inside the encoder. If you want to reset the zero point, you need to reset it according to the above steps.

- B. How to use the multi-turn function in the communication control mode.

After the origin position is set by the method (A), the current motor position can be known by reading the absolute position through communication each time the power is turned on.

- C. Control how to use the multi-turn function through pulse control.

Method 1: The ZO signal can be output by connecting the motor. When the motor position is greater than the zero position ZO, the conduction signal is always output, and when the motor position is less than the zero position ZO,
Pass signal. Right after power on, the controller reads ZO. When ZO is on, it is zero when it is reversed until ZO is non-conducting. Just power on, the controller reads ZO, when ZO is not conducting, it will be forwarded to ZO
The continuity is zero.

Method 2: You can save the motor parameter special function as 6. In this way, it will automatically go back to the set origin every time the power is turned on. The speed of returning to the origin after power-on passes through the
To set up,

Return to origin speed = () Acceleration units + 1) *100

For example: when the acceleration is 20000, the speed of returning to the origin is 100. When the acceleration is 20005, the speed of returning to the origin is 600.

- D. How to turn on the battery power-down alarm.

First, set up the system first, after connecting the battery, use the provided host computer software to change the ones place of the static maximum output (0x18) to a single number (the default is generally 506 to 505)
Yes), the battery power-down alarm function will be turned on. Since the battery is not connected when it is powered on for the first time, an alarm will be issued to indicate that the battery is powered down, and the EN can be sent via comm
(Or the clearing alarm of the control word sends 1), then the alarm can be cleared. As long as there is a power-down alarm, if the alarm is not cleared, the power-on in the future will always give an alarm to prompt the power-down alarm.
The alarm will be cleared until EN is set to 1 once.

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10. Instructions for the absolute value of multi-turn braking

A. Multi-turn origin setting method:

First, control the motor to rotate to the origin position of the equipment through the upper computer provided by us. (Mdobus enable sends 1 first, then sends pu steps to control motor rotation)

At this time, the parameter save and send 3 (the function is to save the single-turn origin. After saving, the parameter save will display 2).

Unplug the motor power plug directly (note that you can only directly power on the motor terminals, and not indirectly cut off the switching power supply by cutting off 220V). In this position, the motor will automatically

Record it as the origin. When the 220V switching power supply input is cut off, because the switching power supply capacitor can store energy, the voltage drops slowly, and the motor detects the power supply drop process, and it will autom
The current position is saved, and the absolute value position register is automatically read and updated next time the power is turned on. (Note: So if the capacitance of the switching power supply is too small, it may not work normally.

In this case, please connect a 1000UF/63v electrolytic capacitor on the DC output side of the switching power supply).

B. How to use communication control:

First of all, the motor is required to be a motor with brake, and the multi-turn absolute value function is turned on first, and the settings are as follows:

Modbus is enabled to send 1.

Special function sending 7.

Save the parameters and send 1.

Power on again.

When powering on, directly read the value of the absolute position register, which is the current position value of the motor. 32768 is a circle.

C. How to use pulse control:

Way 1:

First of all, the motor is required to be a motor with brake, and the multi-turn absolute value function is turned on first, and the settings are as follows:

Modbus is enabled to send 1.

Special function sending 7.

Save the parameters and send 1.

Power on again.

The ZO signal can be output by connecting the motor. When the motor position is greater than the zero position ZO, the conduction signal is always output, and when the motor position is less than the zero position ZO, the non-co
Right after power on, the controller reads ZO. When ZO is on, it is zero when it is reversed until ZO is non-conducting. Just power up, the controller reads ZO, when ZO is not conducting, it will turn to zero when ZO is conducting.
point.

Method 2: You can save the motor parameter special function as 8. In this way, it will automatically go back to the set origin every time the power is turned on.

Modbus is enabled to send 1.

Special function sending 8.

Save the parameters and send 1.

Power on again.

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Five, **CANOPEN** communication method

5.01 Hardware connection

The internal 485 of the drive is isolated by optocoupler, which solves the problem that one host is connected to multiple slaves and is easily interfered and damaged.

5.02 CAN communication format

The canopen communication protocol adopts the data frame standard format. The data frame format is shown in the figure below:

SOF: Frame interval.

Identifier: Range 0~255, which means the address of the target device. The host sends data to the slave, and the identifier is the address of the slave. The slave sends data to the host,
The symbol is the host address.

RTR: 0: Data frame. (1: Remote frame). EasyCan only uses data frames.

r1: 0: Standard identifier. (1: Extended identifier). EasyCan only uses standard identifiers.

r0: Receive bit.

DLC: Data length code.

Data segment: Please refer to the following table for the specific protocol.

5.03 EDS file description

The EDS (Electronic Data Sheet) file is the identification file or similar code of the slave station connected to the PLC. This file is used to identify the type of the slave station (401, 402, 403).
Which is similar to or belongs to which device in 402). This file contains all the information of the slave station, such as manufacturer, serial number, software version, support wave
The type of special rate, the OD that can be mapped and the attributes of each OD and other parameters are similar to the GSD file of Profibus. Therefore, before proceeding with the hardware configuration, we first need
Import the EDS file of the slave station into the upper configuration software.

5.04 Object List

CANopen address description:

A complete CANopen address format is: 60400010 (control word),

- 60400010 (highlighted display): Index (16-bit address).
- 60400010 (highlighted display): Subindex (8-bit subaddress) form represents register addressing,
- 60400010 (highlighted display): The number of digits 0x08 means that the length of data stored in this register is 1 Byte, and the number of digits of 0x10 means that the length of data stored is 2 Byte, the number of digits 0x20 means that the length of the stored data is 4 Bytes,
- R: Readable, W: Writable, S: Saveable, M: Mappable,

Device information parameter list:

name	Canopen address	Read only/ Read and write	Parameter range	Parameter Description
Equipment type	10000020	Read only	0x20192	Parameter meaning: Servo drive, in line with DS402 specification

0x1018 Number of sub-indexes	10180010	Read only	4	1018 object has 4 sub-indexes
Vendor ID	10180120	Read only	0x331	Vendor ID (Vendor_ID) is 0X331
Product Code	10180220	Read only	0x1	Product code (Product_code) is 0x1
version number	10180320	Read only	0x100	Version number (Version_number) is 0x100
serial number	10180420	Read only	0x1	The serial number (serial_number) is 0x1
PDO synchronization ID	10050020	Read only	0x80	The default synchronization ID of PDO is 0x80

Heartbeat parameter list:

name	Canopen address	Read only/ Read and write	Parameter range	Parameter Description
Heartbeat interval time	10170010	RWM	0~65535	0: no heartbeat 1~65535: Interval time, in milliseconds
0x1016 Number of sub-indexes	10160008	R	1	The default is 1, and the sub-index is 1.
Consumption heartbeat interval time	10160120	RWM	See the description below	

0x10160120

31~24	23~16	15~0bit
invalid	0~7F (the address of the heartbeat generator) default 7F	Range 0~65535 (0: Heartbeat monitoring is not turned on 1~65535: unit ms, this time Stop processing if no heartbeat is received within the range) The default is 2000

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List of control parameters:

name	Canopen land site	modbus address	Read only/ Read and write	Parameter range	Parameter Description
Modbus enable	26000010	0x00	Read and write	0~1	0: Modbus disabled 1: modbus enable
Drive output enable	26010010	0x01	Read and write	0~1	0: Drive output prohibited 1: Drive output enable
Trapezoidal speed (Position mode speed)	60810020	0x02	Read and write	0~3000 r/min	In position mode (work mode 1), the maximum speed
Motor acceleration	60830020	0x04	Read and write	0~65535 (r/min)/s	When the parameter is less than 60000, the acceleration and deceleration curve is generated inside the drive, and the parameter is greater than At 60000, no acceleration/deceleration pulse is generated inside the drive
Field weakening angle	26040010	0x06	Read and write	0~306 r/min	Internal parameters do not need to be set separately
Speed loop proportional coefficient	60F90110	0x07	Read and write	0~10000	Represents 0.0~10.0 The larger the value, the stronger the rigidity The ones place is an even number: the pulse input polarity is valid at the moment of disconnection The ones place is odd: the pulse input polarity is valid at the moment of conduction
Speed loop integral time	60F90210	0x08	Read and write	2~2000 ms	Integration time 2~2000ms The smaller the value, the stronger the rigidity
Position loop scale factor	60FB0110	0x09	Read and write	0~30000	Position KP, the larger the value, the stronger the rigidity The ones place is an even number: the alarm output is normally open (normally is normally open, and the alarm is normally closed) The ones place is odd: the alarm output is normally closed (normally is normally closed, and the alarm is normally open)
Velocity feedforward	60FB0210	0x0a	Read and write	0~12.0V/ KRPM	327 represents 1V/KRPM, no need to set it yourself
DIR polarity	26090010	0x0b	Read and write	0~1	0: External DIR does not conduct and rotate clockwise 1: External DIR turns on and rotates clockwise
Electronic gear molecule	260A0010	0x0c	Read and write	0~65535	16-bit electronic gear numerator If the numerator of the electronic gear is 0, special functions can be realized. See the introduction above for details.
Electronic gear denominator	260B0010	0x0d	Read and write	1~65535	16-bit electronic gear denominator
Incremental position	260C0020	0x0e	Read and write		The number of steps to take (write directly to update)
Alarm code	260E0010	0x10	Read only		
Actual current	60780010	0x11	RM	0~32767	The actual current is x/2000(A)

Actual motor speed	606C0010	0x12	Read only	-30000~30000 r/min	Actual motor speed = current motor speed/10
System voltage	60790010	0x13	Read only	0~32767	The actual voltage is x/327 (V)
System temperature	26120010	0x14	Read only	0~100	Celsius
System output PWM	26130010	0x15	Read only	-32768~32767	Represents -100%~100%
Parameter save flag	26140010	0x16	Read and write	0~1	0: The parameter is not saved 1: Saving parameters 2: Saved
Device address	26150010	0x17	Read and write	0~255	Device address (can communication needs to be saved and the new address will take effect after power-on again)
Actual location	60640020	0x18	RM		The current actual position of the motor

	60630020				
Maximum allowable output at rest	261A0010	0x1a	Read and write	0~609	0~609 corresponds to the maximum allowable output 0~60.9% one place 1~9 corresponds to a locked-rotor alarm between. Ones place 0 locked rotor without alarm
Mode selection	26190010	0x1b	Read and write	0~100	0: pulse + direction mode 2: Encoder follow mode 3: Speed mode, duty cycle speed regulation (10%~90% corresponds to 0~1000RPM) 6. When the battery is in the state, it will automatically go back to the multi-circle zero point after power-on. 7. With brake motor, brake multi-turn absolute value function, power-on multi-turn position update in absolute Location register. 8. With brake motor, brake multi-turn absolute value function, automatically go back to the origin after power on. 9. The default CANOPEN control is on power-on, and the pulse is invalid. 30~32768: The angle of automatic rotation when power on, the algorithm is: X*360°/32768
Target location cache	607A0020	0x1c	Read and write		CANOPEN location cache. This parameter is used for incremental position, absolute position, or real Renewal is implemented, controlled by the control word.
Speed mode speed	60FF0020	0x1e	RWM	-3000~3000	Target speed in speed mode (mode 3).
Can communication synchronization control Character	261C0010	0x20	Read and write	0~65535	0: Turn off the synchronization mode. When greater than 0, the internal 2ms time base will be synchronized and turned on Synchronous mode. When the value is 255, the synchronization is synchronized by the DIR signal, DIR needs to input a signal that switches between high and low levels every 0.1ms. No.
Maximum allowable current	261D0010	0x21	Read and write	0~10009	The unit is mA, corresponding to the maximum allowable working current of 0~10.009A Ones place 1~9, corresponding to the maximum current 1~9 seconds, it will alarm and stop When the ones place is 0, the maximum current is reached and the maximum current is maintained without alarm
Input port status	60FD0010	0x22	RM		
Control word	60400010	0x23	RWM		See the table below for details
Status word	60410010	0x24	RM		See the table below for details
Operating mode	60600008	0x25	RWM		Operating mode: 1: Position mode 3: Speed mode 6: Find the origin mode 7: Motion interpolation based on CANopen
Back to origin method	60980008	0x26	RW	17~21	For details, please refer to 5.09 Find Origin Mode

The bits of the control word (6040H) are defined as follows:

Bit:	15:9	8	7	6	5	4	3	2	1	0
definition:	without	Stop	fault reset	0: Absolute position 1: Phase position	The position takes effect immediately, the new set point is executed, the operation is allowed, the emergency stop voltage output is allowed to start					

Bit0: After set to 1, the external pulse control is invalid.

Bit4: Each time 1 is written, it will run to the new position value. Set to 0 automatically after executing the new position value;

Bit8: When the value is 1, the motor stops urgently, but the motor is still in self-locking state.

The bits of the status word (6041H) are defined as follows:

Bit:	7	6	5	4	3	2	1	0

definition:	without	without	Emergency stop alarm	Voltage output	Servo alarm	Allow operation	start up	Ready to start
Bit:	15	14	13	12	11	10	9	8
definition:	without	without	Find the origin error	Find the origin complete	without	Goal achieved	without	without

Bit10: In the position mode, the target position arrival is set to 1. In speed mode, it is set to 1 when reaching the given speed.

5.05 SDO communication format

SDO is mainly used to transmit low-priority objects between devices. It is typically used to configure and manage slave devices, such as modifying current loops, speed loops, and position loops.
This kind of data transmission is the same as MODBUS's PID parameters, PDO configuration parameters, etc., that is, after the master station sends it out, the slave station needs to return a data response. This way of communication
It is only suitable for parameter setting, not suitable for data transmission that requires high real-time performance.

The communication mode of SDO is divided into uploading and downloading. The upper computer can read and write the internal OD of the servo according to the dedicated SDO read and write instructions. In CANopen protocol
In, the content of the object dictionary can be modified through SDO (Service Data Object), the following describes SDO
The structure of the command and the guidelines to follow.

The basic format of SDO read command is as follows:

CS command symbol:

Host read command symbol: 0x40=Read.

Slave machine reply read command character: 0x4F=read reply one byte. 0x4B=Read and reply two bytes. 0x43=Read and reply four bytes.

Host send (read data)

Arbitration section	Control section	Data segment							
CAN identifier	DLC (data segment length)	1	2	3	4	5	6	7	8
0x600 + device_ID	0x08	0x40	Object index		Subindex		blank		

Slave response (read data)

Arbitration section	Control section	Data segment							
CAN identifier	DLC (data segment length)	1	2	3	4	5	6	7	8
0x600 + device_ID	0x08	CS command	Object index		Subindex		Return data		

The basic format of SDO write command is as follows:

Host write command: 0x2F=Write one byte. 0x2B=Write two bytes. 0x23=Write 4 bytes.

The slave responds to the write command symbol: 0x60=write success. 0x80=Error response.

Host send (write data)

Arbitration section	Control section	Data segment							
CAN identifier	DLC (data segment length)	1	2	3	4	5	6	7	8
0x600 + device_ID	0x08	CS command	Object index		Subindex		Data written		

Slave response (write data)

Arbitration section	Control section	Data segment							
CAN identifier	DLC (data segment length)	1	2	3	4	5	6	7	8
0x600 + device_ID	0x08	CS command	Object index		Subindex		blank		

5.06 SDO position mode

5.06.1 Absolute position mode SDO control process

Internal address	Variable name	Settings	Message (ID=1)	Remark

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60400010	Control word	0xF	601 2B 40 60 00 0F 00	Start + voltage output + allow emergency stop + allow operation
			581 60 40 60 00	Reply successfully written
60600008	Operating mode	0x1	601 2F 60 60 00 01	Work mode is set to position mode
			581 60 40 60 00	Reply successfully written
60640020	Actual location (1)	Read	601 40 64 60 00	Read current position
			581 43 64 60 00 C3 00 00 00	Reply to the current position as C3 (decimal 195)
60810020	Trapezoidal speed	1000	601 23 81 60 00 E8 03 00 00	The trapezoid speed is written into 1000RPM (If the default value is used, this item is omitted)
			581 60 81 60 00	Reply successfully written
60830020	Trapezoidal acceleration	20000	601 23 83 60 00 20 4E 00 00	Trapezoidal acceleration and deceleration write 20000RPM/S (if the default value is used, this item is omitted)
			581 60 83 60 00	Reply successfully written
60400010	Control word	0x2F	601 2B 40 60 00 2F 00	Absolute position control mode + new position is executed immediately
			581 60 40 60 00	Reply successfully written
607A0020	Location cache (2)	50000pu	601 23 7A 60 00 50 C3 00 00	Position cache writes 50000 pulses
			581 60 7A 60 00	Reply successfully written
60410010	Status word	Read	601 40 41 60 00	Read status word
			581 40 41 60 00 37 04	The status word 10BIT is 1, go to the target position

(1) Note: In absolute position mode, you need to read the current position before execution, because the motor encoder is a single-turn absolute value, and the actual position just after power-on is the encoder single-turn position. if It is the absolute value of the multi-turn with battery, and the position of the absolute value of the multi-turn is read after power-on

(2) Note: In the mode that the new position is executed immediately, the data is cached and the motor will immediately turn to the target position.

5.06.2 Relative Position Mode SDO Control Process

Internal address	Variable name	Settings	Message (ID=1)	Remark
60400010	Control word	0xF	601 2B 40 60 00 0F 00	Start + voltage output + allow emergency stop + allow operation
			581 60 40 60 00	Reply successfully written
60600008	Operating mode	0x1	601 2F 60 60 00 01	Work mode is set to position mode
			581 60 40 60 00	Reply successfully written
607A0020	Location cache	50000pu	601 23 7A 60 00 50 C3 00 00	Position cache writes 50000 pulses
			581 60 7A 60 00	Reply successfully written
60810020	Trapezoidal speed	1000	601 23 81 60 00 E8 03 00 00	The trapezoid speed is written into 1000RPM (If the default value is used, this item is omitted)
			581 60 81 60 00	Reply successfully written
60830020	Trapezoidal acceleration	20000	601 23 83 60 00 20 4E 00 00	Trapezoidal acceleration and deceleration write 20000RPM/S (if the default value is used, this item is omitted)
			581 60 83 60 00	Reply successfully written
60400010	Control word	0x4F	601 2B 40 60 00 4F 00	Relative position control mode
			581 60 40 60 00	Reply successfully written
60400010	Control word	0x5F	601 2B 40 60 00 5F 00	Go to a new location
			581 60 40 60 00	Reply successfully written
60410010	Status word	Read	601 40 41 60 00	Read status word
			581 40 41 60 00 37 04	The status word 10BIT is 1, go to the target position

Note: You only need to send a new position buffer and then send 0x5F to the control word. The motor starts to run. After reaching the target position, the status word 10BIT is 1.

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5.07 SDO speed mode

5.07.1 Speed mode SDO control process

Internal address	Variable name	Settings	Message (ID=1)	Remark

60600008	Operating mode	3	601 2F 60 60 00 03	Working mode is set to speed mode
			581 60 40 60 00	Reply successfully written
60FF0020	Speed mode speed	1000	601 23 FF 60 00 F4 01 00 00	Set running speed 1000RPM/S
	Spend		581 60 FF 60 00	Reply successfully written
60400010	Control word	0xF	601 2B 40 60 00 0F 00	Start speed
			581 60 40 60 00	Reply successfully written
60410010	Status word	Read	601 40 41 60 00	Read status word
			581 4B 41 60 00 37 04	The status word 10BIT is 1, reaching the target speed
60400010	Control word	0x10F	601 2B 40 60 00 0F 01	stop
			581 60 40 60 00	Reply successfully written
60410010	Status word	Read	601 40 41 60 00	Read status word
			581 4B 41 60 00 37 04	The status word 10BIT is 1, reaching the target speed

5.08 PDO communication format

PDO can transmit 8 bytes of data at a time. There is no other protocol preset (meaning that the data content has been predefined). It is mainly used to transmit data that requires high frequency exchange.
according to. The PDO transmission method breaks the existing data question-and-answer transmission concept and adopts a brand-new data exchange mode. The two parties of the equipment first define the data connection in each device b
In the receiving and sending area, the relevant data can be directly sent to the data receiving area of the other party during data exchange, which reduces the time for question and answer queries and greatly improves the bus communication
The efficiency of the system has resulted in extremely high bus utilization.

5.08.1 PDO COB-ID description

COB-ID is a unique method of CANopen communication protocol. Its full name is Communication Object Identifier-Communication Object-ID. These COB-IDs are
PDO defines the corresponding transmission levels. With these transmission levels, the controller and servo can define the same transmission level and the transmission in their respective software configurations.
Content, so that after the controller and the servo adopt the same transmission level and transmission content, the transmission of data becomes transparent, that is, both parties know the content of the data to be transmitted.
There is no need for the other party to reply whether the data transmission is successful when transmitting data.

The default ID allocation table is based on the 11-bit CAN-ID defined by CANopen 2.0A (the CANopen 2.0B protocol COB-ID is 29 bits), including a 4-bit function
The energy code part and a 7-digit Node-ID part are shown in the figure below.

Notice:

Node-ID —— the station number of the servo, the range of Node-ID is 1 ~ 127;
Function Code ——The function code for data transmission, which defines the transmission level of various PDO, SDO, and management messages. The smaller the function code, the higher the priority.

CANopen pre-defined master/slave connection set CAN identifier allocation table

Object	COB-ID
SYNC	080H
PDO1 (transmit)	181H-1FFH
PDO1 (receive)	201H-27FH
PDO2 (transmit)	281H-2FFH
PDO2 (receive)	301H-37FH
PDO3 (transmit)	381H-3FFH
PDO3 (receive)	401H-47FH
PDO4 (transmit)	481H-4FFH
PDO4 (receive)	501H-57FH
SDO (Send/Server)	581H-5FFH
SDO (Receive/Customer)	601H-67FH
NMT (heartbeat production and heartbeat consumption)	701H-77FH

5.08.2 RPDO configuration instructions

RPDO1: Receiving PDO refers to the data received by the servo relative to the servo. These data are sent by the PLC or controller. The function code of RPDO1 (COB-ID) is: 0x200+servo station number

Note: The address of the servo motor will be automatically set to the station number of RPDO. The factory default is 1.

RPDO1 (COB-ID: 0x200+servo station number) default configuration table (target position of CSP control word working mode):

Host -> Motor (RPDO1)

Arbitration section	Control section	Data segment							
CAN identifier	DLC (data segment length)	1	2	3	4	5	6	7	8
0x200 + device_ID	0x07	Control word (6040)		Working mode (6060)	Target location cache (607A)				

RPDO1 index (Index)	Subindex (Sub-index)	Description	type of data	Parameter range	Parameter Description
1600	00	RPDO1 mapping group quantity	Unsigned8	3	The default is 3 and cannot be changed.
	01	RPDO1 mapping 1	Unsigned32	60400010	Default mapping to control word
	02	RPDO1 mapping 2	Unsigned32	60600008	Default mapping to working mode
	03	RPDO1 mapping 3	Unsigned32	607A0020	Default mapped to the target location cache
1400	01	COB-ID: send/receive this Frame ID of PDO	Unsigned32	0x200+ (0~127)	The actual COB-ID is 0x200+this parameter number. Setting the device address through SDO will Also set this value.
	02	Transmission type	Unsigned8	255	255 (asynchronous mode): the number of servo receiving According to the update immediately.
	03	Inhibit time Beam time (1/10ms)	Unsigned16	1	Default is 1

RPDO2 (COB-ID: 0x300+servo station number) default configuration table (PV target position trapezoidal speed):

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Host -> Motor (RPDO2)

Arbitration section	Control section	Data segment							
CAN identifier	DLC (data segment length)	1	2	3	4	5	6	7	8
0x300 + device_ID	0x08	Target location cache (607A)				Trapezoidal speed (6081)			

RPDO2 index (Index)	Subindex (Sub-index)	Description	type of data	Parameter range	Parameter Description
1601	00	Number of RPDO2 mapping groups	Unsigned8	2	The default is 2 and cannot be changed.
	01	RPDO2 mapping 1	Unsigned32	607A0020	Default mapped to the target location cache
	02	RPDO2 mapping 2	Unsigned32	60810020	Default mapped to trapezoidal speed
1401	01	COB-ID: send/receive this Frame ID of PDO	Unsigned32	0x300+ (0~127)	The actual COB-ID is 0x300+this parameter number. Setting the device address through SDO will Also set this value.
	02	Transmission type	Unsigned8	255	255 (asynchronous mode): the number of servo receiving According to the update immediately.
	03	Inhibit time Beam time (1/10ms)	Unsigned16	1	Default is 1

RPDO3 (COB-ID: 0x400+servo station number) default configuration table (CSV control word mode target speed):

Host -> Motor (RPDO3)

Arbitration section	Control section	Data segment							
CAN identifier	DLC (data segment length)	1	2	3	4	5	6	7	8

0x400 + device_ID	0x07	Control word (6040)	Working mode (6060)	Speed mode speed (60FF)

RPDO3 index (Index)	Subindex (Sub-index)	Description	type of data	Parameter range	Parameter Description
1602	00	Number of RPDO3 mapping groups	Unsigned8	3	The default is 3 and cannot be changed.
	01	RPDO3 mapping 1	Unsigned32	60400010	Default mapping to control word
	02	RPDO3 mapping 2	Unsigned32	60600008	Default mapping to working mode
	03	RPDO3 mapping 3	Unsigned32	60FF0020	Default mapped to speed mode speed
1402	01	COB-ID: send/receive this Frame ID of PDO	Unsigned32	0x400+ (0~127)	The actual COB-ID is 0x400+this parameter number. Setting the device address through SDO will Also set this value.
	02	Transmission type	Unsigned8	255	255 (asynchronous mode): the number of servo receiving According to the update immediately.
	03	Inhibit time Beam time (1/10ms)	Unsigned16	1	Default is 1

RPDO4 (COB-ID: 0x500+servo station number) default configuration table (P target position):

Host -> Motor (RPDO4)

Arbitration section	Control section	Data segment							
CAN identifier	DLC (data segment length)	1	2	3	4	5	6	7	8

0x500 + device_ID	0x4	Target location cache (607A)	

RPDO4 index (Index)	Subindex (Sub-index)	Description	type of data	Parameter range	Parameter Description
1603	00	Number of RPDO4 mapping groups	Unsigned8	1	The default is 1, and it cannot be changed.
	01	RPDO4 mapping 1	Unsigned32	607A0020	Default mapped to the target location cache
1403	01	COB-ID: send/receive this Frame ID of PDO	Unsigned32	0x500+ (0~127)	The actual COB-ID is 0x500+this parameter number. Setting the device address through SDO will Also set this value.
	02	Transmission type	Unsigned8	1	1 (Sync mode): 1 SYNC received Perform data update after signal.
	03	Inhibit time Beam time (1/10ms)	Unsigned16	1	Default is 1

5.08.3 TPDO configuration instructions

TPDO1: Compared with the servo, sending PDO refers to the data sent by the servo. These data are sent by the servo motor. The function code of TPDO1

(COB-ID) is: 0x180+servo station number

Note: The address of the servo motor will be automatically set to the station number of TPDO. The factory default is 1.

TPDO1 (COB-ID: 0x180+servo station number) default configuration table (actual position + status word):

Motor -> Host (TPDO1)

Arbitration section	Control section	Data segment							
CAN identifier	DLC (data segment length)	1	2	3	4	5	6	7	8
0x180 + device_ID	0x6	Actual position (6064)				Status word (6041)			

TPDO1 index (Index)	Subindex (Sub-index)	Description	type of data	Parameter range	Parameter Description
1A00	00	TPDO1 mapping group quantity	Unsigned8	2	The default is 2 and cannot be changed.
	01	TPDO1 mapping 1	Unsigned32	60640020	Map to actual location by default
	02	TPDO1 mapping 2	Unsigned32	60410010	Default mapping to status word
1800	01	COB-ID: send/receive this Frame ID of PDO	Unsigned32	0x180+ (0~127)	The actual COB-ID is 0x180+this parameter number. Setting the device address through SDO will Also set this value.
	02	Transmission type	Unsigned8	255	255 (asynchronous mode): servo received Reply to TPDO1 immediately after RPDO1 data
	03	Inhibit time Beam time (1/10ms)	Unsigned16	3	Default is 1

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TPDO2 (COB-ID: 0x280+servo station number) default configuration table (actual position + status word):

Motor -> Host (TPDO2)

Arbitration section	Control section	Data segment							
CAN identifier	DLC (data segment length)	1	2	3	4	5	6	7	8
0x280 + device_ID	0x6	Actual position (6064)			Status word (6041)				

TPDO2 index (Index)	Subindex (Sub-index)	Description	type of data	Parameter range	Parameter Description
1A01	00	Number of TPDO2 mapping groups	Unsigned8	2	The default is 2 and cannot be changed.
	01	TPDO2 mapping 1	Unsigned32	60640020	Map to actual location by default
	02	TPDO2 mapping 2	Unsigned32	60410010	Default mapping to status word
1801	01	COB-ID: send/receive this Frame ID of PDO	Unsigned32	0x280+ (0~127)	The actual COB-ID is 0x280+this parameter number. Setting the device address through SDO will Also set this value.
	02	Transmission type	Unsigned8	255	255 (asynchronous mode): servo received Reply to TPDO2 immediately after RPDO2 data
	03	Inhibit time Beam time (1/10ms)	Unsigned16	3	Default is 1

TPDO3 (COB-ID: 0x380+servo station number) default configuration table (current speed + status word):

Motor -> Host (TPDO3)

Arbitration section	Control section	Data segment							
CAN identifier	DLC (data segment length)	1	2	3	4	5	6	7	8
0x380 + device_ID	0x6	Current speed (606C)			Status word (6041)				

TPDO2 index (Index)	Subindex (Sub-index)	Description	type of data	Parameter range	Parameter Description
1A02	00	Number of TPDO2 mapping groups	Unsigned8	2	The default is 2 and cannot be changed.
	01	TPDO2 mapping 1	Unsigned32	606C0010	Default mapped to current speed
	02	TPDO2 mapping 2	Unsigned32	60410010	Default mapping to status word
1802	01	COB-ID: send/receive this Frame ID of PDO	Unsigned32	0x380+ (0~127)	The actual COB-ID is 0x380+this parameter number. Setting the device address through SDO will Also set this value.
	02	Transmission type	Unsigned8	255	255 (asynchronous mode): servo received Reply to TPDO3 immediately after RPDO3 data
	03	Inhibit time	Unsigned16	3	Default is 1

	Beam time (1/10ms)	

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TPDO4 (COB-ID: 0x480+servo station number) default configuration table (actual position + status word):

Motor -> Host (TPDO4)

Arbitration section	Control section	Data segment							
CAN identifier	DLC (data segment length)	1	2	3	4	5	6	7	8
0x480 + device_ID	0x6	Actual position (6064)				Status word (6041)			

TPDO4 index (Index)	Subindex (Sub-index)	Description	type of data	Parameter range	Parameter Description
1A03	00	Number of TPDO4 mapping groups	Unsigned8	2	The default is 2 and cannot be changed.
	01	TPDO4 mapping 1	Unsigned32	60640020	Map to actual location by default
	02	TPDO4 mapping 2	Unsigned32	60410010	Default mapping to status word
1803	01	COB-ID: send/receive this Frame ID of PDO	Unsigned32	0x480+ (0~127)	The actual COB-ID is 0x480+this parameter number. Setting the device address through SDO will Also set this value.
	02	Transmission type	Unsigned8	255	255 (asynchronous mode): servo received Reply to TPDO4 immediately after RPDO4 data
	03	Inhibit time Beam time (1/10ms)	Unsigned16	3	Default is 1

5.08.4 SYNC synchronization signal

The SYNC signal is used for the synchronous execution of the position buffer of RPDO4. After the position of RPDO4 is received by the motor, the motor will not execute, and the host can send multiple addresses Position cache, after sending, start running at the same time through SYNC signal.

The SYNC signal format is as follows:

Host -> Motor (SYNC)

Arbitration section	Control section	Data segment							
CAN identifier	DLC (data segment length)	1	2	3	4	5	6	7	8
0x80	0x0	without				without			

5.09 Find origin mode

According to the CANopen DS402 standard protocol, various zero return methods are defined. Currently, the 17th to 22nd zero return methods are supported. The specific motion trajectories of various zero return methods are as follows:

17: The negative limit is connected to the DIR port of the motor. The high level in the figure below indicates that there is a 5V voltage difference between DIR+ and DIR-.

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18: The positive limit is connected to the PU port of the motor. The high level in the figure below means that there is a 5V voltage difference between PU+ and PU-.

19: The origin switch is connected to the DIR port of the motor . The high level in the figure below indicates that there is a 5V voltage difference between DIR+ and DIR-.

21: The origin switch is connected to the DIR port of the motor . The high level in the figure below indicates that there is a 5V voltage difference between DIR+ and DIR-.

Control the process of finding the origin:

control target	Variable name	Settings	Message (ID=1)	Remark
60980008	Back to origin method	0x11 (decimal 17)	601 2F 98 60 00 11	The method of finding the origin is set to 17
			581 60 98 60 00	Reply successfully written
60600008	Operating mode	0x6	601 2F 60 60 00 06	Work mode is set to position mode
			581 60 40 60 00	Reply successfully written
60410010	Status word	Read	601 40 41 60 00	Read status word
			581 40 41 60 00 14 00	The status word 12BIT is 0, still in the process of finding the origin
60410010	Status word	Read	601 40 41 60 00	Read status word
			581 40 41 60 00 14 14	The status word 12BIT is 1, the origin search is completed

5.10 PDO position mode

5.10.1 Absolute position mode

In absolute position mode, RPDO1, RPDO2 and TPDO1, TPDO2 are used. The control process is as follows:

control target	Variable name	Settings	Message (ID=1)	Remark
Find the origin				Refer to 5.09 to find the origin process.
				If you use the multi-turn absolute value step, omit it

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RPDO2	Target position + trapezoidal speed	50000+1000	301 50 C3 00 00 E8 03 00 00	(Target position 50000) + trapezoidal speed 1000
TPDO2	Current position + status word	Reply value	281 17 43 00 00 04 04	Current position 0x4316 (17175 decimal) + status word 0x404
				Note: This command is to get the current position.
				1. If the motor is a single-turn absolute value, the current position range is
				0~32768.
				2. The number of laps can only be recorded if it is the absolute value of multiple laps with a battery. reply

				The data can be the position of multiple circles. 3. If you go through the process of finding the origin of the limit switch, the return value is 0 A number on the left and right.
RPDO1	Control word + working mode + target position	0xF+0x1+50000	201 2F 00 01 50 C3 00 00	(Absolute position + immediate execution) + position mode + target position 50000
TPDO1	Current position + status word	Reply value	181 55 43 00 00 37 00	Current position 0x4355 + status word 0x037 Note: The current position does not reach the given 0xc350 status word 10bit Is 0, the target position is not reached.
RPDO2	Target position + trapezoidal speed	50000+1000	301 50 C3 00 00 E8 03 00 00	(Target position 50000) + trapezoidal speed 1000
TPDO2	Current position + status word	Reply value	281 50 c3 00 00 37 04	Current position 0x50c3 (50000 decimal) + status word 0x437 Note: Reach the given position 0xc350, the status word 10bit is 1, and the To the target location.
RPDO2	Target position + trapezoidal speed	10000+1000	301 10 27 00 00 E8 03 00 00	(Target position 10000) + trapezoidal speed 1000
TPDO2	Current position + status word	Reply value	281 50 c3 00 00 37 00	Current position 0x50c3 (50000 decimal) + status word 0x037 Note: The new target position 10000 has not been reached, the status word 10bit is 0, You can continue to issue the same command,
RPDO2	Target position + trapezoidal speed	10000+1000	301 10 27 00 00 E8 03 00 00	(Target position 10000) + trapezoidal speed 1000
TPDO2	Current position + status word	Reply value	281 10 27 00 00 37 04	Current position 0x2710 (10000 decimal) + status word 0x437 Note: When the new target position 10000 is reached, the status word 10bit is 1, which can be To start issuing a new position command

5.10.2 Speed mode

In speed mode, RPDO3 and TPDO3 are used. The control process is as follows:

control target	Variable name	Settings	Message (ID=1)	Remark
RPDO3	Control word + work mode + target speed	0xF+0x3+600	401 0F 00 03 58 02 00 00	Motor enable + speed mode + target speed 600
TPDO3	Current position + status word	Reply value	381 00 00 00 00 37 00	Current speed 0 + status word 0x037
RPDO3	Control word + work mode + target speed	0xF+0x3+-600	401 0F 00 03 A8 FD FF FF	Motor enable + speed mode + target speed -600
TPDO3	Current position + status word	Reply value	381 58 02 00 00 37 00	Current speed 600 + status word 0x37
RPDO3	Control word + work mode + target speed	0xF+0x3+-600	401 0F 00 03 A8 FD FF FF	Motor enable + speed mode + target speed -600
TPDO3	Current position + status word	Reply value	381 A8 FD FF FF 37 04	Current speed -600 + status word 0x437

5.10.3 Position interpolation mode

In position interpolation mode, first set the motor to be controlled to different addresses in advance, for example, first set to address 1, 2, 3. Then directly send to the RPDO4 of the motor, respectively Finished sending 3 motors. At this time, the position motor is only temporarily stored and will not work. After the controller sends a SYNC synchronization signal, the motors work at the same time. The appeal process needs to be

Complete within 2ms. The interpolation cycle is completed every 2ms.

control target	Variable name	Settings	Message (ID=1)	Remark
Address 1 RPDO4	target location	50000	501 50 C3 00 00	Target position 50000 Address 1 Motor
Address 1 TPDO4	Current position + status word	Reply value	481 78 0D 00 00 37 04	Current position 0xD78 (3448 decimal) + status word 0x437 Note: This command is to get the current position. The motor will not execute 1. If the motor is a single-turn absolute value, the current position range is 0~32768. 2. The number of laps can only be recorded if it is the absolute value of multiple laps with a battery. reply The data can be the position of multiple circles.
Address 2 RPDO4	target location	50000	501 50 C3 00 00	Target position 50000 Address 2 Motor
Address 2 TPDO4	Current position + status word	Reply value	481 4D 18 00 00 37 04	Current position 0x4D18 (6221 decimal) + status word 0x437
Address 3 RPDO4	target location	50000	501 50 C3 00 00	Target position 50000 Address 3 Motor
Address 3 TPDO4	Current position + status word	Reply value	481 68 29 00 00 37 04	Current position 0x2968 (10600 decimal) + status word 0x437
SYNC	Sync signal	without	80	Three motors are executed simultaneously.

Note: The above process is executed every 2ms to complete the interpolation.

5.11 Production and consumption of heartbeat

5.11.1 Production of Heartbeat

The object that controls the heartbeat generation is the interval time between heartbeat generation (index 0x1017 sub-index 0), in milliseconds. The default is 1000ms. A heartbeat packet is generated every second. Insert When the motor is on, one heartbeat packet can be received every second when the communication is normal. As shown below:

Note: The content of the heartbeat packet 05 means normal operation, and 04 means alarm.

5.11.2 Consumption of Heartbeat

Heartbeat consumption is used to automatically stop after the slave is disconnected. The objects that control heartbeat consumption are as follows:

0x10160120

31~24	23~16	15~0bit
invalid	0~7F (the address of the heartbeat generator) default is 7F	Range 0~65535 (0: Heartbeat monitoring is not turned on 1~65535: unit ms, this time Stop processing if no heartbeat is received within the range) The default is 2000

The default parameter is 0X7F07D0, and a can command must be received every 2 seconds, otherwise the motor will alarm and stop. The motor must not start testing until it receives the heartbeat packet on the first day. if When the heartbeat packet is received again after the connection is disconnected, the motor will resume operation.

5.12 Modify baud rate

The modified baud rate can be sent through the host computer software provided by us, or it can be sent using other USBCAN. To be sent according to the following steps:

A. Modbus enable (canopen address 26000010)	send	1
B. Motor acceleration (canopen address 6083020)	send	803 (Note 803:1M 802:500K 801:250K 800:125K)
C. Field weakening angle (canopen address 26040010)	send	129
D. Modbus enable (canopen address 26000010)	send	506

Take effect after power-on

Note: There is no need to send parameters to save, because this is to change internal parameters. Just send it strictly according to the above steps.