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1. Product overview

Stepping servo is a high-speed, high-torque, high-precision, low-vibration, low-heat, and non-lost stepping servo solution based on an ordinary open-loop stepping motor, combined with position feedback and servo algorithms.

The T series stepping servo drives are designed by using the magnetic field orientation (FOC) and vector weakening control algorithms in the servo drives, and have a performance that surpasses ordinary stepping in all directions.

Built-in PID parameter adjustment function, so that the motor can better meet the application of different types of loads;

The built-in field weakening control algorithm weakens the magnetic field characteristics of the motor at high speed and maintains the power;

Built-in current vector control function, so that the motor has servo current characteristics and low heat generation;

Built-in micro-step instruction algorithm to keep the motor stable and low vibration when running at various speeds;

Built-in encoder feedback with 4000 pulse resolution improves positioning accuracy without losing steps.

In short, the servo control scheme combined with the characteristics of the stepper motor enables the T series stepper servo drive to better exert the performance of the stepper motor, can replace the servo application of the same power, and is a new choice for the best cost-effective automation equipment.

T60 driver can set subdivision and other parameters through DIP switch and debugging software. It has protection functions such as voltage, current and position. It adds alarm output interface, and its input and output signals adopt photoelectric isolation.

Power supply	24 – 60 VDC
control precision	4000 Pulse/r
Pulse mode	Direction & pulse, CW/CCW double pulse, A/B quadrature pulse
Current control	Servo vector control algorithm
Subdivision settings	DIP switch setting, 15 choices (or debugging software setting)
Speed range	Conventional 1200~1500rpm, up to 4000rpm
Resonance suppression	Automatic calculation of resonance point to suppress mid-frequency vibration
PID parameter	Debugging software to adjust motor PID characteristics

adjustment	
Pulse filter	2MHz digital signal filter
Alarm Output	Alarm output for overcurrent, overvoltage, position error, etc.

We hope that our excellent performance products can help you complete the motion control project excellently.

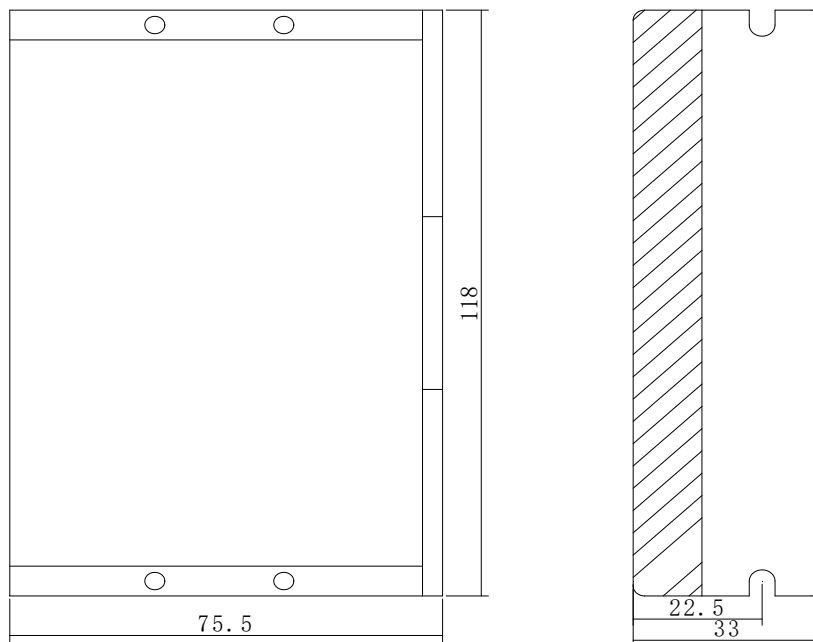
Please read this technical manual before using this product.

2. Application environment and installation

2.1 Application environment requirements

project	T60PLUS
Installation Environment	Avoid dust, oil, corrosive environment
vibration	0.5G (4.9m/s ²) Max
Operating temperature/humidity	0 °C ~ 45 °C / below 90%RH (no condensation)
Storage and transportation temperature	-10 °C ~ 70 °C
cooling method	Natural cooling / keep away from heat source
waterproof level	IP54

2.2 Drive installation dimensions



3. Drive ports and wiring

3.1 Port function description

Function	Grade	Definition	Remarks
Power supply input	V+	Input to the positive pole of the DC power supply	DC 24~50V
	V-	Input to the negative pole of the DC power supply	
	NC	Not connected/undefined	

Motor connection	A+	Positive terminal of phase-A winding	Red
	A-	Negative terminal of phase-A winding	Blue
	B+	Positive terminal of phase-b winding	Green
	B-	Negative terminal of phase-b winding	Black
Encoder connection	EB+	Positive terminal of Encoder phase B	Green
	EB-	Negative positive terminal of Encoder phase B	Yellow
	EA+	Positive terminal of Encoder phase A	Brown
	EA-	Negative positive terminal of Encoder phase A	White
	EZ-	Encoder Z phase negative terminal	Black
	EZ+	Encoder Z phase positive terminal	Grey
	VCC	Encoder working power 5V positive	Red
	GND	Encoder working power 5V ground terminal	Blue
Pulse control signal and input and output	PUL+	Pulse input interface	When used for 5V control signal.
	PUL-		For 24V control signal, 24V is connected to COM+, pulse and direction are connected to PUL-, DIR-
	DIR+	Direction input interface	
	DIR-		
	ENA+	Enable control interface	24V level, the motor can be enabled when it is not connected by default, when it is connected to 0V, the motor will turn off the output
	ENA-		
	REST	Reserve	Reserve

	COM+	Control signal 24V common	Control signal 24V common
	ALM+	Alarm output interface	Optocoupler isolation, open collector output
	ALM-		
	BRK		
	PEND	In position output	
	Z-	Encoder Z signal single-ended output	
	COM-	Output common negative	Control signal 0V common

3.2 Power supply input

The power supply of the drive is DC power, and the input voltage range is between 24V~ 50V.

Do not mistakenly connect the power supply to the NC pin, and do not reversely connect the polarity of the input power! !

Power selection reference:

Voltage:

The stepper motor has the characteristic of torque decreasing as the motor speed increases, and the voltage of the input power supply will affect the declining amplitude of the motor torque at high speed. Increasing the voltage of the input power supply appropriately can increase the output torque of the motor at high speed.

Stepper servos have higher revolution speed and torque output than ordinary steppers. Therefore, if the better high-speed performance is wanted, the power supply voltage of the drive is required to increase.

Current:

The work of the drive is to convert the input power supply with high voltage and low current to the low voltage and high current at both terminals of the motor winding. In actual application, the appropriate power supply is selected according to the motor mode and the torque of the load.

The effects of regeneration voltage:

When the stepper motor is working, it also keeps the characteristics of the generator. At deceleration, the kinetic energy accumulated by the load is converted into electric energy, which will be superimposed on the drive circuit and the input power. In application, attention should be paid to the setting of acceleration and deceleration time to prevent the protection of the drive or power supply.

When the drive is powered off, similarly, the drive LED indicator will be on if the load is increased to allow the motor to move

3.3 Encoder connection

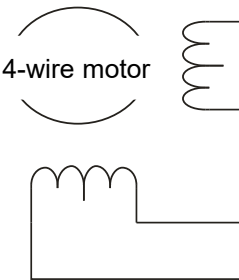
The T60 encoder is A/B differential output and is connected in the corresponding order when used.

EB+	EB-	EA+	EA-	VCC	GND
Green	Yellow	Brown	White	Red	Blue

Rtelligent also provides a certain length of special cables for encoders. Please purchase the extension cables of different lengths according to the installation needs.

3.4 Motor connection

The matching motor of the T60 drive is the corresponding T series stepper servo motor, and its corresponding motor connection order is fixed and unique.



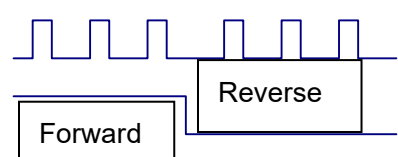
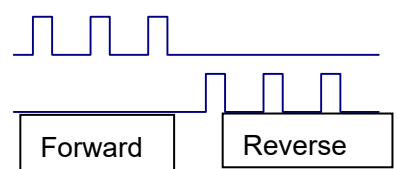
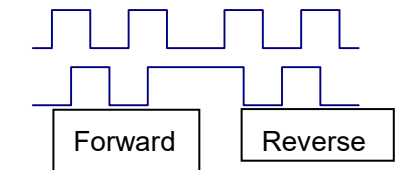
	Nema 23/24 Motor	Nema 17 Motor
A+	Red	Black
A-	Blue	Red
B+	Green	Blue
B-	Black	Yellow

3.5 Control signal connection

3.5.1 PUL, DIR Port: connection for pulse command

The signal interface of standard T series drive is pulse-shaped, and the T60 can receive three types of pulse command signals.

The upper controller can be the pulse signal generating device, such as PLC, MCU, control card and controller.

Pulse and direction (PUL + DIR)	
Double pulse (CW +CCW)	
Orthogonal pulse (A/ B orthogonal pulse)	

3.5.2 ENA port: enable/disable

When the default optocoupler is off, the drive outputs the current to the motor. When the internal optocoupler is on, the drive will cut off the current of each phase of the motor so that the motor is in a free state, and the stepper pulse can not be responded.

When the motor is in the wrong state, the port enables automatic disconnection. The level logic of the enable signal can be set to the opposite.

3.5.3 ALM port: alarm output

The ALM port is used to output the drive operating status to the external control circuit. ALM outputs different optocoupler levels respectively when the drive is in wrong state and normal operation state.

3.5.4 PEND: In position output

The PEND port is used to indicate whether the motor is within the set accuracy.

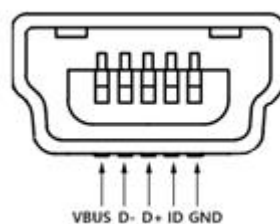
3.5.5 BRK port: brake signal

Open collector output, control relay, and then control brake.

3.5.6 Z signal output:

The encoder Z signal is photoelectrically isolated and output by the collector.

3.6 USB serial port



The USB is a Mini Usb connection port, and a USB driver needs to be installed

4. The setting of DIP switches and operating parameters

Setting stepping of level number	SW1-SW4, the four DIP switches, are used for selection of the 16 micro-stepping levels in total. Please set the correct micro-stepping levels in reference to the description of drive panel; other micro-stepping levels can be modified via testing software after turning all SW1-SW4 on.
Setting of running direction	SW5 is used for selection of an initial running direction for the motor. The setting can become valid after the drive is powered off and restarted.
Selection of pulse smoothing	SW6 is used for selection of whether to enable the internal type S command smoothing function. On means that the function is enabled to make the input pulse signal of the drive smoother. The setting can become valid after the drive is powered off and restarted.
Pulse mode selection	SW7 is used for selection of the input pulse mode, with Off referring to the pulse & direction and on the double pulse. It can also be modified as the orthogonal pulse mode via the testing software. The setting can become valid after the drive is powered off and restarted.

4.1 The setting of pulse per revolution

Stepping count/revolution	SW1	SW2	SW3	SW4	Remarks
Default	on	on	on	on	The DIP switch is turned to the Default state and the testing software can freely change other micro-stepping level number
800	off	on	on	on	
1600	on	off	on	on	
3200	off	off	on	on	
6400	on	on	off	on	
12800	off	on	off	on	
25600	on	off	off	on	
51200	off	off	off	on	

1000	on	on	on	off	
2000	off	on	on	off	
4000	on	off	on	off	
5000	off	off	on	off	
8000	on	on	off	off	
10000	off	on	off	off	
20000	on	off	off	off	
40000	off	off	off	off	

DIP SW1, SW2, SW3, SW4 are used to set the number of pulse needed for per motor revolution

Motor speed = command pulse frequency / pulse per revolution

Motor stroke = number of command pulses / pulse per revolution

4.2 Motor direction selection

DIP SW5 is used to set the running direction of the motor under the initial pulse.

The “off” means that the motor direction is counterclockwise when inputting the initial pulse;

The “on” means that the motor direction is clockwise when inputting the initial pulse.

※ The initial pulse is the testing pulse used when developing the drive software; Please refer to the actual running direction of the motor.

4.3 Pulse filtering function selection

DIP SW6 is used to set the pulse filtering function of drive.

The “off” means the pulse filtering function is off;

The “on” means the pulse filtering function is on.

※ The pulse filtering function is the filtering action by the drive upon the input commands. When the filtering function is on, the drive will smoothen the input pulse command to make the acceleration and deceleration of motor softer, but this will also cause certain delay of the pulse command.

Filtering time setting: The default time of filtering function is 6.4ms, and the software can change the time below the 25.6ms.

4.4 Pulse mode selection

DIP SW7 is used to set the driver pulse command mode.

Off means pulse + direction (single pulse) mode; on means double pulse mode.

※ When you need to set the drive pulse mode to A / B quadrature pulse mode, you need to set the pulse mode check function to A / B quadrature pulse mode in the debugging software and set SW7 to on.

4.5 Bandwidth selection

DIP SW8 is used to set the input pulse frequency bandwidth of the driver.








“ off ” means the maximum input pulse frequency bandwidth is 200KHz;

“ on ” means that the maximum input pulse frequency bandwidth is 1MHz.

※ When you need to set the input pulse frequency bandwidth to other values (less than 2MHz), you need to set the input pulse frequency bandwidth check function to the value you need in the debugging software and set SW8 to on.

※ **The above parameters are set for the DIP switches; For other parameters, please refer to Appendix A: Application Instructions for Testing Software**

5. Drive working status LED indication

LED status		Drive status
	Green indicator is on for long time	Drive not enabled
	Green indicator is flickering	Drive working normally
	One green indicator and one red indicator	Drive overcurrent
	One green indicator and two red indicators	Drive input power overvoltage
	One green indicator and three red indicators	The internal voltage of the drive is wrong
	One green and four red indicators	Tracking error exceeds limits
	One green and five red indicators	Encoder phase error

6. Communication protocol and register description

T60Plus integrates a USB interface to realize USB-to-serial communication. Communication adopts MODBUS/RTU protocol.

6.1 Communication parameters

The communication parameters are set as follows:

1. Baud rate: 38400;
2. Data bits: 8 data bits;
3. Stop bit: 1 stop bit;
4. Check Digit: There is no check digit.

The address of the slave is fixed 1.

6.2 Register summary

Register address (decimal)	Operation type	type of data	Function Description	Remarks
0	R	SHORT	Alarm Code, alarm sign	
1	R	SHORT	Status Code, drive status flag	
2	R	SHORT	Current input port value	
3	R	SHORT	Current output port value	
4	R	SHORT	General-purpose input port conduction trigger state	
5	R	SHORT	Universal input port disconnect trigger status	
6	W	SHORT	Continuity trigger status clear register	
7	W	SHORT	Disconnect trigger status clear register	
8	R	SHORT	In internal pulse mode, the current absolute position is lower 16 bits	Form a LONG data
9	R	SHORT	In internal pulse mode, the current absolute position is high 16 bits	
10	R	SHORT	Given speed RPM	
11	R	SHORT	Bus voltage mV	
12	R	SHORT	Low 16 bits of motor tracking error in closed loop mode	Form a LONG data
13	R	SHORT	High 16 bits of motor tracking error in closed loop mode	
14	R	SHORT	Low 16 bits of external pulse counter	Form a LONG

15	R	SHORT	High 16 bits of external pulse counter	data
16	W	SHORT	Clear external pulse counter	
17	R/W	SHORT	Command working mode: internal command or external pulse	
18	R/W	SHORT	The motion command when the internal command mode and the application mode is 0	
19	R	SHORT	Pulse command form when external pulse	
20	R/W	SHORT	Application mode selection in internal command mode	
21	R/W	SHORT	Motor type selection: two-phase or three-phase	
22	R/W	SHORT	Motor control mode selection: open loop, servo mode one, servo mode two	
23	R/W	SHORT	Inverted motor running direction	
24	R/W	SHORT	Motor subdivision (pulse number/revolution)	
25	R/W	SHORT	Operating current (mA)	
26	R/W	SHORT	Standby current percentage (%)	
27	R/W	SHORT	Time to enter standby after pulse stops (ms)	
28	R/W	SHORT	S-shaped acceleration and deceleration time	
29	R	SHORT	Encoder current position (number of pulses)	
30	R/W	SHORT	Enable the automatic identification of drive parameters	
31	R	SHORT	Auto-identified resistance value mOhm	
32	R	SHORT	Auto-identified inductance value mH	
33	R/W	SHORT	When canceling automatic identification, the resistance value set by the user	
34	R/W	SHORT	When canceling automatic identification, the electric steel value set by the user	
35	R/W	SHORT	Motor torque coefficient, reserved for internal use of the drive	
36	R/W	SHORT	Current loop proportional gain	
37	R/W	SHORT	Current loop integral gain	
38	R/W	SHORT	Current loop phase lead gain	
39	R/W	SHORT	Current loop step test	
40	R/W	SHORT	Motor encoder resolution	
41	R/W	SHORT	Tracking error alarm threshold	
42	R/W	SHORT	Positioning completion accuracy	
43	R/W	SHORT	Positioning completion time	
44	R/W	SHORT	The time from pulse stop to start to detect positioning completion	
45	R/W	SHORT	Maximum current	
46	R/W	SHORT	Base current	
47	R/W	SHORT	One-stage speed feedback filter	
48	R/W	SHORT	Two-stage speed feedback filter	
49	R/W	SHORT	Servo mode one low speed anti-resonance gain	

50	R/W	SHORT	Servo mode two position loop proportional gain	
51	R/W	SHORT	Servo mode two position loop integral gain	
52	R/W	SHORT	Servo mode two speed loop damping 1	
53	R/W	SHORT	Servo mode 2 Speed loop damping 2	
54	R/W	SHORT	Servo mode two speed loop feedforward gain	
55	R/W	SHORT	Servo mode two gravity compensation	
56	R/W	SHORT	Servo mode 2 acceleration gain	
57	R/W	SHORT	Servo mode 2 acceleration feedforward gain	
58	R/W	SHORT	Servo mode two speed loop output filter	
59	R/W	SHORT	Servo mode two acceleration feedforward filter	
60	R/W	SHORT	Input port 1 setting register	
61	R/W	SHORT	Input port 2 setting register	
62	R/W	SHORT	Input port 3 setting register	
63	R/W	SHORT	Input port 4 setting register	
64	R/W	SHORT	Input port 5 setting register	
65	R/W	SHORT	Input port 6 setting register	
66	R/W	SHORT	Output port 1 setting register	
67	R/W	SHORT	Output port 2 setting register	
68	R/W	SHORT	Output value setting register when output port 1 and 2 are in general output port mode	
69	R	SHORT	Input function status	
70	R/W	SHORT	Point-to-point motion acceleration (r/s^2)	
71	R/W	SHORT	Point-to-point movement deceleration (r/s^2)	
72	R/W	SHORT	Maximum speed of point-to-point movement (RPM)	
73	R/W	SHORT	Point-to-point movement stroke low 16 bits (PUISE)	Form a LONG data
74	R/W	SHORT	Point-to-point motion stroke high 16 bits (PUISE)	
75	R/W	SHORT	Start acceleration during continuous operation (R/S^2)	
76	R/W	SHORT	Deceleration when decelerating and stopping in continuous operation (R/S^2)	
77	R/W	SHORT	Speed during continuous operation (RPM)	
78	R/W	SHORT	Deceleration during emergency stop	
79	R/W	SHORT	Return to zero mode selection	
80	R/W	SHORT	Return to zero high speed	
81	R/W	SHORT	Return to zero low speed	
82	R/W	SHORT	Zero acceleration	
83	R/W	SHORT	Position offset after zero return	
84	R/W	SHORT	Position mode selection: incremental motion and absolute motion	
85	R/W	SHORT	The internal instruction counter is cleared	
88	R/W	SHORT	Out of tolerance alarm is invalid	
89	R/W	SHORT	Servo mode-integral gain	

90	R/W	SHORT	Write 1 will save the current parameters, and then automatically clear	
91	R/W	SHORT	Write 1 to restore the factory settings, and then automatically clear	
92	R	SHORT	Reserved by the manufacturer, please do not write any value in this register	
93	R	SHORT	Drive ID	
94	R	SHORT	Drive version	
95	R	SHORT	Non-labeled	
100	R/W	SHORT	In speedometer and position meter mode, the effective time of IO switching	
101	R/W	SHORT	Current step test current (mA)	
102	R/W	SHORT	Output port 3 setting register	
103	R/W	SHORT	Output port 4 setting register	
104	R	SHORT	Output port mark	
105	R/W	SHORT	Internal speed 0	
106	R/W	SHORT	Internal speed 1	
107	R/W	SHORT	Internal speed 2	
108	R/W	SHORT	Internal speed 3	
109	R/W	SHORT	Internal speed 4	
110	R/W	SHORT	Internal speed 5	
111	R/W	SHORT	Internal speed 6	
112	R/W	SHORT	Internal speed 7	
113	R/W	SHORT	Internal speed 8	
114	R/W	SHORT	Internal speed 9	
115	R/W	SHORT	Internal speed 10	
116	R/W	SHORT	Internal speed 11	
117	R/W	SHORT	Internal speed 12	
118	R/W	SHORT	Internal speed 13	
119	R/W	SHORT	Internal speed 14	
120	R/W	SHORT	Internal speed 15	
121	R/W	SHORT	Position table currently triggered	
122	R/W	SHORT	Default parameter ID number	
125	R/W	SHORT	Low 16 bits of internal position 0	Form a LONG data
126	R/W	SHORT	Internal position 0 high 16 bits	
127	R/W	SHORT	Internal position 1 low 16 bits	Form a LONG data
128	R/W	SHORT	Internal position 1 high 16 bits	
129	R/W	SHORT	Internal position 2 low 16 bits	Form a LONG data
130	R/W	SHORT	Internal position 2 high 16 bits	
131	R/W	SHORT	Internal position 3 low 16 bits	Form a LONG

132	R/W	SHORT	Internal position 3 high 16 bits	data
133	R/W	SHORT	Internal position 4 low 16 bits	Form a LONG data
134	R/W	SHORT	Internal position 4 high 16 bits	
135	R/W	SHORT	Internal position 5 low 16 bits	Form a LONG data
136	R/W	SHORT	Internal position 5 high 16 bits	
137	R/W	SHORT	Internal position 6 low 16 bits	Form a LONG data
138	R/W	SHORT	Internal position 6 high 16 bits	
139	R/W	SHORT	Internal position 7 low 16 bits	Form a LONG data
140	R/W	SHORT	Internal position 7 high 16 bits	
141	R/W	SHORT	Internal position 8 low 16 bits	Form a LONG data
142	R/W	SHORT	Internal position 8 high 16 bits	
143	R/W	SHORT	Internal position 9 low 16 bits	Form a LONG data
144	R/W	SHORT	Internal position 9 high 16 bits	
145	R/W	SHORT	Internal position 10 low 16 bits	Form a LONG data
146	R/W	SHORT	Internal position 10 high 16 bits	
147	R/W	SHORT	Internal position 11 low 16 bits	Form a LONG data
148	R/W	SHORT	Internal position 11 high 16 bits	
149	R/W	SHORT	Internal position 12 low 16 bits	Form a LONG data
150	R/W	SHORT	Internal position 12 high 16 bits	
151	R/W	SHORT	Internal position 13 low 16 bits	Form a LONG data
152	R/W	SHORT	Internal position 13 high 16 bits	
153	R/W	SHORT	Internal position 14 low 16 bits	Form a LONG data
154	R/W	SHORT	Internal position 14 high 16 bits	
155	R/W	SHORT	Internal position 15 low 16 bits	Form a LONG type data
156	R/W	SHORT	Internal position 15 high 16 bits	
157	R/W	SHORT	Torque mode speed loop proportional gain	
158	R/W	SHORT	Torque mode speed loop integral gain	

6.3 Register details

6.3.1 Driver flag register [0~1]

Alarm flag register[0]

Define all the alarm flags of the drive. MODBUS address: 0

15				11				10		9		8			
Reserve												ECDE1			
R-0						R-0									
7		6		5		4		3		2		1		0	
POSE		MPE		MEM		OT		UV		OV		OC		IVE	
R-0		R-0		R-0		R-0		R-0		R-0		R-0		R-0	

BIT	Name	Description
9~15	Reserve	Reading always returns 0
8	ECDE1	Encoder failure 0: Encoder signal is normal 1: Encoder signal is abnormal
7	POSE	Tracking error alarm 0: No tracking error alarm 1: A tracking error alarm occurs, and the motor cannot follow the encoder normally. The possible effects are as follows: Position out of tolerance alarm threshold Encoder wiring Motor wiring Whether the setting of speed, acceleration and other parameters is reasonable
6	MPE	Motor phase loss alarm 0: No phase loss alarm 1: A phase loss alarm occurs, and the drive cannot detect the current of the motor winding normally. Need to detect motor wiring and motor type
5	MEM	Parameter check error 0: Parameter verification is correct 1: Parameter verification error.
4	OT	Parameter check error

		0: Parameter verification is correct 1: Parameter verification error.
3	UV	Undervoltage alarm sign 0: No undervoltage alarm 1: The drive has undervoltage
2	OV	Overvoltage warning sign 0: no overvoltage alarm 1: The drive has overvoltage, and the following tests need to be done: Check input power Check the pump voltage when the motor is decelerating
1	OC	Overcurrent alarm flag 0: no overcurrent alarm 1: The driver has over-current alarm, possible reasons: Motor winding is short-circuited The current set by the driver is too large, causing the motor to burn out The internal components of the drive are damaged
0	IVE	Internal voltage error alarm flag 0: No internal voltage error 1: Internal voltage error, usually caused by damage to the internal components of the drive

Drive status register[1]

Some status flags inside the drive are defined. MODBUS address: 1

15				11		10		9		8					
Reserve				TC		POW		NL		PL					
R-0															
7		6		5		4		3		2		1		0	
CLAMP		ARRSPD		RDY		HOME		MOV		INPOS		ALM		ENA	
R-0		R-0		R-0		R-1		R-0		R-0		R-0		R-1	

BIT	Nema	Description
8~15	Reserve	Reading always returns 0
11	TC	Torque reaching state 0: The torque has not reached the set value

		1: Torque reaches the set value
10	POW	Power state 0: The drive is not powered 1: The drive is supplying power
9	NL	Negative limit valid state 0: not in the negative limit position 1: In the negative limit position
8	PL	Positive limit valid state 0: not in the positive limit position 1: In the positive limit position
7	CLAMP	Motor mechanical brake state 0: The brake is not opened, and the motor shaft is mechanically locked 1: The brake has been opened and the motor can run
6	ARRSPD	Whether the motor runs to the set speed 0: Speed is not reached 1: The speed has been reached In the internal pulse command mode, it is used to indicate whether the motor has reached the set speed.
5	RDY	Drive ready sign 0: Not ready 1: Ready
4	HOME	Back to zero flag 0: Return to zero is not completed 1: Return to zero has been completed
3	MOV	Motor movement logo 0: Motor stopped state 1: The motor is running When the motor is in the running state, it cannot respond to the new motion command, but can only respond to the stop command.
2	INPOS	Motor positioning completed flag in closed loop mode 0: Positioning is not completed 1: Positioning completed
1	ALM	Drive alarm flag 0: The drive has no alarm 1: The drive has alarmed, please check the status of the register REG_ALMCODE (address 0)
0	ENA	Drive enable flag

		0: The drive is not enabled 1: The drive has been enabled The drive is already enabled when it is powered on by default
--	--	---

6.3.2 Input and output status register [2~7]

Input port value register[2]

Used to indicate the value of the current input port. Since the input port is optically isolated, in order to facilitate understanding, the article uses whether the optocoupler is on to indicate the state of the input port. MODBUS address: 2

15															8																								
Reserve																																							
R-0																																							
7					6					5					4					3					2					1					0				
Reserve										IN6					IN5					IN4					IN3					IN2					IN1				
R-0										R-0					R-0					R-0					R-0					R-0					R-0				

BIT	Name	Description
6~15	Reserve	Reading always returns 0
5	IN6	The level state of the input port IN6 0: Input port 6 is not conducting 1: Input port 6 is on
4	IN5	The level state of the input port IN5 0: Input port 5 is not conducting 1: Input port 5 is on
3	IN4	The level state of the input port IN4 0: Input port 4 is not conducting 1: Input port 14 is on
2	IN3	The level state of the input port IN3 0: Input port 3 is not conducting 1: Input port 3 is on
1	IN2	The level state of the input port IN2 0: Input port 2 is not conducting 1: Input port 2 is on
0	IN1	The level state of the input port IN1 0: Input port 1 is not conducting 1: Input port 1 is turned on

Current output port value [3]

Output port value register. MODBUS address: 3

15				8			
Reserve							
R-0							
7		4		3	2	1	0
Reserve				OUT4	OUT3	OUT2	OUT1
R-0				R-0	R-0	R-0	R-0

BIT	Name	Description
4~15	Reserve	Reading always returns 0
3	OUT4	Level status of output port 4 (used by other products) 0: Output port 4 is not conducting 1: Output port 4 is on
2	OUT3	Level status of output port 3 (used by other products) 0: Output port 3 is not conducting 1: Output port 3 is on
1	OUT2	Level status of output port 2 0: Output port 2 is not conducting 1: Output port 2 is on
0	OUT1	Level status of output port 1 0: Output port 1 is not conducting 1: Output port 1 is on

Input port turn-on edge latch register[4]

Every time the port changes from the off state to the on state, the driver will latch this change edge. MODBUS address: 4

[illegible]

BIT	Name	Description
6~15	Reserve	Reading always returns 0

5	IN6	Input port IN6 conduction edge latch flag 0: Input port 6 has not had a turn-on edge 1: Input port 6 has a turn-on edge
4	IN5	Input port IN5 conduction edge latch flag 0: No turn-on edge occurred on input port 5 1: Input port 5 has a turn-on edge
3	IN4	Input port IN4 conduction edge latch flag 0: Input port 4 does not have a turn-on edge 1: Input port 4 has a turn-on edge
2	IN3	Input port IN3 conduction edge latch flag 0: Input port 3 does not have a turn-on edge 1: Input port 3 has a turn-on edge
1	IN2	Input port IN2 conduction edge latch flag 0: Input port 2 does not have a turn-on edge 1: Input port 2 has a turn-on edge
0	IN1	Input port IN1 conduction edge latch flag 0: Input port 1 does not have a turn-on edge 1: Input port 1 has a turn-on edge

Input port turn-off edge latch register[5]

Every time the port changes from on to off, the driver will latch this changing edge.
MODBUS address: 5

15							8	
Reserve								
R-0								
7		6	5	4	3	2	1	0
Reserve		IN6	IN5	IN4	IN3	IN2	IN1	
R-0		R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	

BIT	Nema	Description
6~15	Reserve	Reading always returns 0
5	IN6	Input port IN6 turn-off edge latch flag 0: Input port 6 does not have a shutdown edge 1: Input port 6 has a shutdown edge
4	IN5	Input port IN5 shut-off edge latch flag 0: Input port 5 does not have a shutdown edge 1: Input port 5 has a turn-off edge

3	IN4	Input port IN4 shut-off edge latch flag There is no turn-off edge on input port 4 1: Input port 4 has a shutdown edge
2	IN3	Input port IN3 shut-off edge latch flag 0: Input port 3 does not have a shutdown edge 1: Input port 3 has a shutdown edge
1	IN2	Input port IN2 turn-off edge latch flag 0: Input port 2 does not have a shutdown edge 1: Input port 2 has a shutdown edge
0	IN1	Input port IN1 shut-off edge latch flag 0: Input port 1 has not had a shutdown edge 1: Input port 1 has a shutdown edge

Input port conduction edge clear register [6]

Used to clear the latched conduction edge flag. MODBUS address: 6

15							8
Reserve							
R-0							
7	6	5	4	3	2	1	0
Reserve	IN6	IN5	IN4	IN3	IN2	IN1	
R-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0

BIT	Nema	Description
6~15	Reserve	Reading always returns 0
5	IN6	Clear the ON-edge latch status flag of IN6 0: No effect 1: Clear the ON-edge latch flag of IN6 port
4	IN5	Clear the ON-edge latch status flag of IN5

		0: No effect 1: Clear the ON-edge latch flag of IN5 port
3	IN4	Clear the ON-edge latch status flag of IN5 0: No effect 1: Clear the ON-edge latch flag of IN5 port
2	IN3	Clear the ON-edge latch status flag of IN3 0: No effect 1: Clear the ON-edge latch flag of IN3 port
1	IN2	Clear the ON-edge latch status flag of IN3 0: No effect 1: Clear the ON-edge latch flag of IN3 port
0	IN1	Clear the ON-edge latch status flag of IN1 0: No effect 1: Clear the ON-edge latch flag of IN1 port

Input port shutdown edge clear register [7]

Used to clear the latched turn-off edge flag. MODBUS address: 7

15

8

Reserve

R-0

7	6	5	4	3	2	1	0
Reserve	IN6	IN5	IN4	IN3	IN2	IN1	
R-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	

BIT	Name	Description
6~15	Reserve	Reading always returns 0
5	IN6	Clear the shut-off edge latch status flag of IN6 0: No effect 1: Clear the shut-off edge latch flag of IN6 port

4	IN5	Clear the shut-off edge latch status flag of IN5 0: No effect 1: Clear the shut-off edge latch flag of IN5 port
3	IN4	Clear the shut-off edge latch status flag of IN4 0: No effect 1: Clear the shut-off edge latch flag of IN4 port
2	IN3	Clear the shut-off edge latch status flag of IN3 0: No effect 1: Clear the shut-off edge latch flag of IN3 port
1	IN2	Clear the shut-off edge latch status flag of IN2 0: No effect 1: Clear the shut-off edge latch flag of IN2 port
0	IN1	Clear the shut-off edge latch status flag of IN1 0: No effect 1: Clear the shut-off edge latch flag of IN1 port

6.3.3 Motor current position and speed related registers [8~16]

MODBUS 地址	Attributes	Defaults	Range	Description
8	R	0	[0,65535]	In internal pulse mode, the current absolute position is lower 16 bits
9	R	0	[0,65535]	In internal pulse mode, the current absolute position is high 16 bits
10	R	0	[-3000,3000]	Current command speed. Signed 16-bit data in RPM
11	R	-	[0,100]	Current bus voltage value, unit mV
12	R	0	[0,65535]	In closed loop mode, the motor tracking error is 16 bits low
13	R	0	[0,65535]	Unit: encoder resolution
14	R	0	[0,65535]	In closed-loop mode, the motor tracking error is 16 bits high
15	R	0	[0,65535]	Low 16 bits of external pulse counter
16	R/W	0	[0,1]	High 16 bits of external pulse counter

6.3.4 Drive control mode setting [17~23]

MODBUS 地址	Attributes	Defaults	Range	Description
17	R/W	0	[0,1]	Command mode setting register, set the pulse command source of the drive

				<p>0: Internal pulse command</p> <p>1: External pulse command</p>
18	R/W	0	[0,6]	<p>Control command in internal pulse mode</p> <p>0: Waiting state.</p> <p>The driver receives any control command and will resume the waiting state after the driver processes it. So reading this register always returns 0.</p> <p>1: Fixed length forward rotation.</p> <p>In the relative position mode, the motor runs in the forward direction according to the 70~74 register parameters.</p> <p>In the absolute position mode, the running state is determined according to the current position and the absolute position set from 70 to 74.</p> <p>2: Fixed length reversal.</p> <p>In the relative position mode, the motor runs in the reverse direction according to the 70~74 register parameters.</p> <p>In the absolute position mode, the running state is determined according to the current position and the absolute position set from 70 to 74.</p> <p>3: Speed mode, continuous forward rotation.</p> <p>The motor performs forward acceleration operation according to the 75 and 77 registers</p> <p>4: Speed mode, continuous reverse.</p> <p>The motor performs reverse acceleration operation according to the 75 and 77 registers</p> <p>5: Emergency stop.</p> <p>The motor decelerates and stops according to the 78 register</p> <p>6: Decelerate to stop.</p> <p>Position mode, the motor decelerates and stops according to the 71 register</p> <p>Speed mode, the motor decelerates and stops according to the 76 register</p> <p>Other: No effect.</p> <p>This register only works when the value of internal</p>

				pulse mode register 20 is 0
19	R/W	0	[0,2]	<p>External pulse command mode setting register</p> <p>0: IN1 is the pulse input port, IN2 is the direction input port</p> <p>1: IN1 is the forward pulse input port, IN2 is the reverse pulse input port</p> <p>2: IN1 is the A-phase input port of the quadrature encoder, IN2 is the B-phase input port of the quadrature encoder</p> <p>Other: invalid</p> <p>Note that in mode 2 here, although the driver receives the quadrature encoder signal, the driver only follows it at this time, which is a form of instruction. It is not the position feedback signal of the stepper motor itself. This function can be used to follow the encoder signal output by other devices (such as servo drives).</p>
20	R/W	0	[0,5]	<p>Preset application selection in internal pulse mode</p> <p>0: Respond to instructions of 18 registers</p> <p>1: Reserved, do not use</p> <p>2: Preset IO control mode 1: Start and stop + direction</p> <p>3: Preset IO control mode 2: Forward + Reverse</p> <p>4: Preset IO control mode 3: Internal speedometer</p> <p>5: Preset IO control mode 4: Internal position table</p> <p>6: Preset IO control mode 5: Step position</p> <p>7: Customer customization 1</p> <p>8: Customer customization 2</p> <p>9: Customer customization 3</p> <p>10: Customer customization 4</p> <p>11: Customer customization 5</p> <p>12: Customer customization 6</p> <p>13: Customer customization 7</p> <p>14: Customer customization 8</p> <p>15: Customer customization 9</p> <p>16: Customer customization 10</p>

				17: Customer customization 11 18: Customer customization 12 19: Customer customization 13 20: Customer customization 14 21: Analog speed (customized by customer 15) 22: Analog position (customized 16)
21	R/W	0	[0,1]	Motor type setting register 0: Two-phase stepper motor 1: Three-phase stepper motor
22	R/W	0	[0,2]	Motor operation mode setting register 0: Open loop operation 1: Servo mode one 2: Servo mode two
23	R/W	0	[0,1]	Motor direction inversion setting register 0: Default running direction 1: Reverse the motor running direction

6.3.5 Open loop operation parameter setting [24~29]

MODBUS 地址	Attributes	Defaults	Range	Description
24	R/W	4000	[200,65535]	Subdivision settings Set the subdivision when the drive is running
25	R/W	3000	[0,6000]	Open loop operating current The peak value of the sine of the drive during open loop operation. Unit: mA
26	R/W	50	[0,100]	Standby current percentage Set the percentage of the current when the drive enters the standby state in the open loop operation mode relative to the operating current. unit:%
27	R/W	500	[10,65535]	Standby time setting Set the time for the drive to enter the standby state after the pulse stops for a certain period of time when the drive is running in open loop. Unit: ms
28	R/W	128	[1,512]	Pulse command filter Used to smooth pulse commands (including internal and external pulses), filter time = set value * 50us
29	R	-	-	Encoder current position (number of pulses)

6.3.6 Motor and current loop parameters [30~39]

MODBUS 地址	Attributes	Defaults	Range	Description
30	R/W	0	[0,1]	<p>Automatic PI enable function</p> <p>The driver has built-in parameter recognition and gain optimization algorithms. Normally, better results can be achieved. If the customer needs optimization, you can disable this feature.</p> <p>0: Do not use automatic PI function 1: Use automatic PI function</p>
31	R	-	[100,65535]	<p>Automatically recognized resistance value</p> <p>Read the motor winding resistance value automatically recognized by the drive. Unit: mOhm</p>
32	R	-	[1,65535]	<p>Automatically recognized inductance value</p> <p>Read the motor winding inductance value automatically recognized by the drive. Unit: mH</p>
33	R/W	1000	[100,10000]	<p>User-set resistance value</p> <p>When the automatic PI function is cancelled, the resistance value set by the user takes effect.</p> <p>Unit: mOhm</p>
34	R/W	1	[1,10]	<p>Inductance value set by the user</p> <p>When the automatic PI function is cancelled, the inductance value set by the user takes effect. Unit: mH</p>
35	R/W	200	[0,1000]	<p>Motor torque constant</p> <p>The parameter is only valid when the motor control mode is servo mode 2.</p>
36	R/W	1000	[200,10000]	<p>Motor torque constant</p> <p>The parameter is only valid when the motor control mode is servo mode 2.</p>
37	R/W	200	[0,2000]	<p>Current loop integral gain</p> <p>KI in the current loop PI algorithm. When the automatic PI function is enabled, ILOOPKI is automatically generated, and when the automatic PI function is not enabled, the user can modify ILOOPKI</p>
38	R/W	256	[0,1024]	KC in the current loop PI algorithm.
39	R/W	0	[0,1]	<p>Current step test</p> <p>Writing 0 has no effect, reading always returns 0</p>

				Writing 1 will start the current loop step test. At this time, the current of the motor winding will first be 0, and then increase to 1000mA. Users can view the step response through NTConfigurater, and manually adjust ILOPKP and ILOOPKI to optimize the motor response.
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6.3.7 Closed loop control motor parameters [40~48]

MODBUS 地址	Attributes	Defaults	Range	Description
40	R/W	4000	[256,65535]	Encoder feedback resolution The driver can receive the input signal of the quadrature encoder and perform 4 multiplication processing. Encoder resolution = encoder line number X 4
41	R/W	2000	[100,65535]	Tracking error alarm threshold The alarm threshold is based on the encoder resolution.
42	R/W	10	[1,65535]	Positioning completion accuracy Take the encoder resolution as the unit.
43	R/W	50	[1,65535]	Positioning completion duration Set the duration after the motor enters the completion accuracy, duration = set value X 50us
44	R/W	100	[1,65535]	Time to start detection after positioning is completed After setting the driver to stop receiving pulses, the set time elapses, and then it starts to judge whether the positioning is complete. Set time = set value X 50us
45	R/W	4000	[0,5000]	Maximum current of closed loop control Set the maximum allowable current of the drive during closed-loop operation, sine peak value, unit: mA
46	R/W	50	[0,100]	Percentage of base current for closed-loop control
47	R/W	200	[10,5000]	One-level speed filter, unit: Hz
48	R/W	600	[10,5000]	Secondary speed filter, unit: Hz

6.3.8 Closed loop servo parameters [49~59]

MODBUS 地址	Attributes	Defaults	Range	Description
49	R/W	0	[0,500]	Servo mode one low speed anti-resonance gain
50	R/W	3000	[0,65535]	Servo mode two position loop proportional gain
51	R/W	1000	[0,65535]	Servo mode two position loop integral gain
52	R/W	0	[0,65535]	Servo mode two speed loop damping 1
53	R/W	800	[0,65535]	Servo mode 2 Speed loop damping 2
54	R/W	600	[0,65535]	Servo mode two speed loop feedforward gain
55	R/W	512	[0,1024]	Servo mode two gravity compensation
56	R/W	0	[0,65535]	Servo mode 2 acceleration gain
57	R/W	0	[0,65535]	Servo mode 2 acceleration feedforward gain
58	R/W	5000	[10,5000]	Servo mode two speed loop output filter
59	R/W	2000	[10,5000]	Servo mode two acceleration feedforward filter

6.3.9 Input and output setting register [60~69]、[102~104]

Input port setting register [60~63]

The drive contains 4 input ports, and each input port is set in the same way.

15

8

Reserve

R-0

7

6

5

4

0

Reserve	GPINPOLARITY	GPINPUTFUNC
---------	--------------	-------------

R-0

R/W-0

R/W-0

BIT	Name	Description
6~15	Reserve	Reading always returns 0
5	GPINPOLARITY	Effective level of input port 0: Normally closed 1: Normally open (default value)
0~4	GPINPUTFUNC	Input port function selection 0: Pulse input 1: Direction input 2: Quadrature encoder A phase input 3: Quadrature encoder B phase input 4: Motor offline 5: Clear the fault 6: Emergency stop 7: Jog forward/start/stop 8: Jog reversal/direction 9: Positive limit input 10: Reverse limit input 11: Zero signal 12: Start to return to zero 13: Reverse the motor running direction 14: Multi-stage speed control 0 15: Multi-stage speed control 1 16: Multi-stage speed control 2 17: Multi-stage speed control 3 18: Multi-stage position control 0 19: Multi-stage position control 1 20: Multi-stage position control 2 21: Multi-stage position control 3 22: USER1 23: USER2 24: USER3 25: USER4 26: USER5 27: USER6 28: USER7 29: USER8 30: USER9

0~3	GPOUTPUTFUN C	Output port function selection 0: Normal output, user control 1: Alarm output, OUT0 default value 2: Brake signal output 3: Signal output in place 4: Speed reach output, OUT1 default value 5: Return to zero to complete the output 6: The drive is ready to output 7: Motor stop status output 8: Positive limit output 9: Negative limit output 10: Power indicator output 11: Torque reaches the output Others: the input port has no function, only used as a normal input port
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MODBUS address	Attributes	Defaults	Range	Description
66	R/W	1	[0,11]	Output port 1 setting register
67	R/W	4	[0,11]	Output port 2 setting register
102	R/W	1	[0,11]	Output port 3 setting register (other products)
103	R/W	4	[0,11]	Output port 4 setting register (other products)

- When the output port 1/2 setting register value is set to 0 (normal output, user control function), the register with MODBUS address 68 is used to set whether the output port is on. It should be noted that the output port polarity in MODBUS address 66/67 still works. The description of the MODBUS address 68 register is as follows:

15				8
Reserve				
R-0				
7	2		1	0
Reserve			OUT1VAL	OUT0VAL
R-0			R/W-0	R/W-0

BIT	Nema	Description
2~15	Reserve	Reading always returns 0
1	OUT1VAL	Set the level state of output port OUT1

		0: Output port 1 is not conducting 1: Output port 1 is on
0	OUT0VAL	Set the level state of the output port OUT0 0: Output port 0 is not conducting 1: Output port 0 is turned on

MODBUS address	Attributes	Defaults	Range	Description
68	R/W	0	[0,1]	Output status setting when OUT0 and OUT1 are used as normal output
69	R	-	-	The current input function valid flag bit (consistent with the digital input port function) 0: Corresponding function is invalid 1: The corresponding function is valid
104	R	-	-	Current output function valid flag (consistent with digital output port function) 0: Corresponding function is invalid 1: The corresponding function is valid

6.3.10 Point motion parameter setting [70~74]

MODBUS 地址	Attributes	Defaults	Range	Description
70	R/W	200	[10,1000]	Acceleration during point movement, unit: R/S ²
71	R/W	200	[10,1000]	Deceleration during point movement, unit: R/S ²
72	R/W	600	[0,3000]	Maximum speed during point movement, unit: RPM
73	R/W	2000	[-16777216,16777216]	Running pulse command during point movement, unit: pulse number
74				

The 73 and 74 registers constitute a 32-bit signed register.

- In the incremental operation mode, the absolute values of 73 and 74 indicate the running distance, and register 18 writes 1 or 2 to control whether the motor runs in the forward or reverse direction.
- In the incremental operation mode, the absolute values of 73 and 74 indicate the running distance, and register 18 writes 1 or 2 to control whether the motor runs in the forward or reverse direction.

6.3.11 Jog mode parameter setting [75~78]

MODBU 地址	Attributes	Defaults	Range	Description
75	R/W	100	[10,1000]	Jog acceleration, unit: R/S ²
76	R/W	100	[10,1000]	Jog deceleration, unit: R/S ²
77	R/W	600	[0,3000]	Jog speed, unit: RPM
78	R/W	500	[10,1000]	Emergency stop deceleration, unit: R/S ²

6.3.12 Internal pulse control parameters [84~89]

MODBU 地址	Attributes	Defaults	Range	Description
84	R/W	0	[0,1]	Internal pulse command operation mode 0: Incremental position mode 1: Absolute position mode
85	R/W	0	[0,1]	0: Writing 0 is invalid, reading returns 0 1: The internal pulse command counter is cleared
88	R/W	0	[0,1]	0: Out of tolerance alarm is valid 1: Out of tolerance alarm is invalid
89	R/W	50	[0,500]	Servo mode-integral gain

6.3.13 Driver basic parameter register [90~99]

MODBU 地址	Attributes	Defaults	Range	Description
90	R/W	0	[0,1]	0: Writing 0 is invalid, reading returns 0 1: Write 1 to save the current parameters
91	R/W	0	[0,1]	0: Writing 0 is invalid, reading returns 0 1: Write 1 to restore factory settings
92	-	-	-	The manufacturer reserves the use, and the user prohibits writing data
93	R	-	-	Drive ID number
94	R	-	-	Drive version number
95	R	-	-	Non-labeled

6.3.14 Built-in speedometer parameter setting [100~120]

MODBUS 地址	Attributes	Defaults	Range	Description
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100	R/W	200	[0,65535]	In speedometer and position meter mode, IO switching effective time = set value x 50us
101	R/W	1000	[0,3000]	Current step test current setting
105	R/W	0	[0,3000]	Internal speed 1, unit: RPM
106	R/W	100	[0,3000]	Internal speed 2, unit: RPM
107	R/W	200	[0,3000]	Internal speed 3, unit: RPM
108	R/W	300	[0,3000]	Internal speed 4, unit: RPM
109	R/W	400	[0,3000]	Internal speed 5, unit: RPM
110	R/W	500	[0,3000]	Internal speed 6, unit: RPM
111	R/W	600	[0,3000]	Internal speed 7, unit: RPM
112	R/W	700	[0,3000]	Internal speed 8, unit: RPM
113	R/W	800	[0,3000]	Internal speed 9, unit: RPM
114	R/W	900	[0,3000]	Internal speed 10, unit: RPM
115	R/W	1000	[0,3000]	Internal speed 11, unit: RPM
116	R/W	1100	[0,3000]	Internal speed 12, unit: RPM
117	R/W	1200	[0,3000]	Internal speed 13, unit: RPM
118	R/W	1300	[0,3000]	Internal speed 14, unit: RPM
119	R/W	1400	[0,3000]	Internal speed 15, unit: RPM
120	R/W	1500	[0,3000]	Internal speed 16, unit: RPM

6.3.15 Built-in position meter parameter setting [121~156]

MODBUS 地址	Attributes	Defaults	Range	Description
121	R	-	-	Position table currently triggered
122	R/W	100	[100,110]	Default parameter ID number (do not modify)
125	R/W	0	[-16777216,16777216]	Internal position 1 command
126				P125 number is low 16 bits, P126 number is high 16 bits
127	R/W	0	[-16777216,16777216]	Internal position 2 command
128				P127 number is low 16 bits, P128 number is high 16 bits
129	R/W	0	[-16777216,16777216]	Internal position 3 instructions
130				P129 is the low 16 bits, P130 is the high 16 bits
131	R/W	0	[-16777216,16777216]	Internal position 4 instructions
132				P131 number is low 16 bits, P132 number is high 16 bits

133	R/W	0	[-16777216,1677 7216]	Internal position 5 instructions
134				P133 number is low 16 bits, P134 number is high 16 bits
135	R/W	0	[-16777216,1677 7216]	Internal position 6 instructions
136				P135 number is low 16 bits, P136 number is high 16 bits
137	R/W	0	[-16777216,1677 7216]	Internal position 7 instructions
138				P137 number is low 16 bits, P138 number is high 16 bits
139	R/W	0	[-16777216,1677 7216]	Internal position 8 instructions
140				P139 number is low 16 bits, P140 number is high 16 bits
141	R/W	0	[-16777216,1677 7216]	Internal position 9 instructions
142				P141 is the low 16 bits, P142 is the high 16 bits
143	R/W	0	[-16777216,1677 7216]	Internal position 10 instructions
144				P143 is the low 16 bits, P144 is the high 16 bits
145	R/W	0	[-16777216,1677 7216]	Internal position 11 instructions
146				P145 number is low 16 bits, P146 number is high 16 bits
147	R/W	0	[-16777216,1677 7216]	Internal position 12 instructions
148				P147 number is low 16 bits, P148 number is high 16 bits
149	R/W	0	[-16777216,1677 7216]	Internal position 13 instructions
150				P149 number is low 16 bits, P150 number is high 16 bits
151	R/W	0	[-16777216,1677 7216]	Internal position 14 instructions
152				P151 is the low 16 bits, P152 is the high 16 bits
153	R/W	0	[-16777216,1677 7216]	Internal position 15 instructions
154				P153 is the low 16 bits, P154 is the high 16 bits
155	R/W	0	[-16777216,1677 7216]	Internal position 16 instructions
156				P155 is the low 16 bits, P156 is the high 16 bits

7. Common problems and countermeasures

phenomenon	Possible situation	solution
The motor does not rotate	The power light does not light up	Check the power supply circuit, normal power supply
	The motor locks the shaft but does not rotate	The pulse signal is weak, and the signal current is increased to 7-16mA
	Speed is too small	Choose the right segment
	Drive is protected	Eliminate the alarm and power on again
	Enable signal problem	Pull the enable signal high or not connect

	Command pulse is wrong	Check whether the upper computer has pulse output
Wrong direction of motor	The motor turns in the opposite direction	Adjust DIP switch SW5
	There is an open circuit in the motor wire	Check if the connection is bad
	The motor has only one direction	Wrong pulse mode or damaged DIR port
The alarm indicator is on	Wrong connection of motor wire	Check motor wiring
	Wrong connection of motor encoder wire	Check the encoder line sequence
	The voltage is too high or too low	Check power
Position or speed error	Signal is interfered	Eliminate interference, reliable grounding
	Command input error	Check the host computer instructions to ensure correct output
	Wrong setting of pulse per revolution	Check the status of the DIP switch and connect it
	Encoder signal is abnormal	Replace the motor, contact the manufacturer
Drive terminal burned out	Short circuit between terminals	Check power supply polarity or external short circuit
	Too much internal resistance between terminals	Check whether excessive solder is added to the connection between the wire and the wire to form a tin mass
Motor reported out of tolerance	Acceleration and deceleration time is too short	Reduce the command acceleration or increase the filter parameters of the drive
	Motor torque is too small	Choose high torque motor
	The load is too heavy	Check the load weight and quality, adjust the mechanical structure
	Power supply current is too small	Replace with a suitable power supply

Appendix A. Guarantee Clause

A.1 Warranty period: 12 months

We provide quality assurance for one year from the date of delivery and free maintenance service for our products during the warranty period.

A.2 Exclude the following:

- Improper connection, such as the polarity of the power supply is reversed and insert/pull the motor connection when the power supply is connected.
- Beyond electrical and environmental requirements.
- Change the internal device without permission.

A.3 Maintenance process

For maintenance of products, please follow the procedures shown below:

- (1) Contact our customer service staff to get the rework permission.
- (2) The written document of the drive failure phenomenon is attached to the goods, as well as the contact information and mailing methods of the sender.

Mailing address:

Post code:

Tel.: