

# DS\_C Bus-Type (CANopen)

Low-Voltage Servo

User Manual

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## **Chapter I Product Introduction**

#### 1.1 Product Introduction

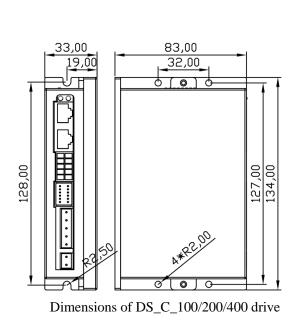
The low-voltage servo drives of DS series are low-voltage servo products developed based on the latest generation 32-bit DSP chips and combined with our company's years of experience in servo motion control, including pulse type, CANopen bus type and RS485 bus type products controlled with three kinds of modes, respectively. This manual mainly introduces CANopen bus type drives.

This drive can support specs from 100W to 750W. The encoder is a 2500-line incremental low-voltage servo motor powered by a low-voltage DC supply. External braking resistors can be connected. This CANopen bus type drive series drives are developed based on the CIA301 and CIA402.V2 standard communication protocols, which are compatible with most of the CANopen master station controllers in the market. Up to 31 drives can be used for networking for realizing synchronous multi-axis high-velocity bus control. The drive supports position mode, velocity mode, torque mode and homing mode and is characterized by high overload capacity, low noise and quick response, etc.

#### 1.2 Product specification

Drive model Parameter		DS_C_100	DS_C_200	DS_C_400	DS_C_750
Matched	motor	100W	200W	400W	750W
Encoder	Encoder 2500-line incremental				
Supply voltage		24V-50V	24V-50V	24V-50V	24V-80V
Output	Rated value	5A	7A	10A	20A
Current	Maximum	15A	21A	30A	57A
Drive size (mm) (L*H*W)			134 * 83 * 33		168 * 100 * 36
Drive weight (kg)			0.35		0.7

## 1.3 Mounting dimensions



36,00 18,00 71,00 100,80 71,00 100,80 71,00 100,80 71,00 100,80

Dimensions of DS\_C\_750 drive



## **Chapter II Wiring and Setting**

## 2.1 Description of terminal function

## 2.1.1 Braking resistor terminals

Terminal name	Description
RB+	Connected to external braking resistor DS P 100/200/400 drive: 10R 50W
RB-	DS_P_100/200/400 drive: 10R 30W DS_P_750 drive: 10R 100W

#### 2.1.2 Power supply terminal

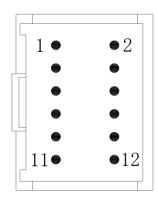
Terminal name Drive model	VDC: DC power supply, positive GND: DC power supply, negative
DS_C_100	DC voltage: 24V~50V
D5_C_100	Recommended power supply: 24V, 5A
DS_C_200	DC voltage: 24V~50V
DS_C_200	Recommended power supply: 36V, 9A
DC C 400	DC voltage: 24V~50V
DS_C_400	Recommended power supply: 48V, 10A
DC C 750	DC voltage: 24V~80V
DS_C_750	Recommended power supply: 48V or higher, 20A

## 2.1.3 Motor winding terminal

Terminal name	Description
U	
V	Motor three-phase winding
W	

#### 2.1.4 Encoder wire terminal

Pin No.	Signal	Color	Pin No.	Signal	Color	
1	EA+	Yellow	2	HU+	Grey	
3	EA-	Yellow/black	4	HV+	Orange	
5	EB+	Green	6	HW+	White	
7	EB-	Green/black	8	EVCC	Red	
9	EZ+	Brown	10	EGND	Black	
11	EZ-	Brown/black	12	PE	Yes	



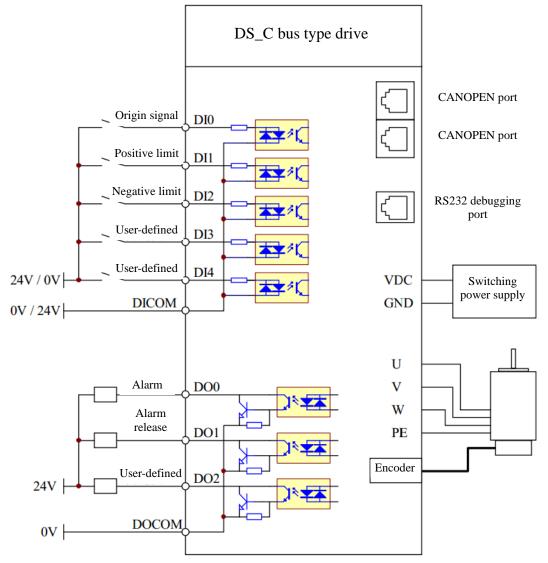
Pins for terminal



#### 2.1.5 DI/DO terminal

No.	Name	Definition of terminal			
1	DI0				
2	DI1				
3	DI2				
4	DI3	4			
5	DI4				
6	DICOM	6   5			
7	DO0	8            7			
8	DO1	10 9			
9	DO2				
10	DOCOM				

#### Wiring diagram of input / output signal

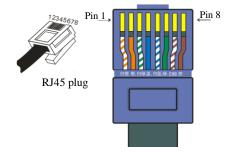


Note: Both the common cathode and common anode connection methods can be used for the DI port, while for the output port, only the common cathode connection method can be used.

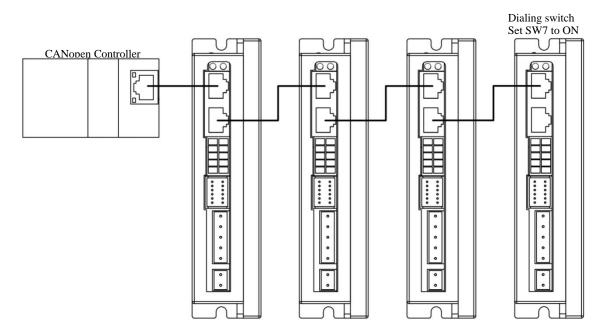


## 2.1.6 Definition of communication port pins

Pin	Network cable color	Signal definition
1	White/orange	CAN+
2	Orange	CAN-
3	White/green	GND
4	Blue	NC
5	White/blue	NC
6	Green	NC
7	White/brown	NC
8	Brown	NC

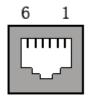


The DS\_C bus type drive has 2 standard RJ45 network interfaces, in which Pins 1 and 2 correspond to CAN+ and CAN- signal wires, respectively, and Pin 3, to GND. It is recommended to use a shielded twisted-pair or network cable as the transmission medium for communication. All nodes shall be directly connected to this pair of public transmission medium and arranged in parallel for receiving or sending data information. For the drive at the end of the bus, the dial switch SW7 shall be set to ON, indicating that a terminating resistance shall be connected for termination in order to prevent the signal sent by the node on the network from being reflected when reaching the end of the cable.



#### 2.1.7 Definition of RS232 debugging port pins

Pin	Symbol	RMK
2	GND	Signal ground
3	TXD	RS232 sending port
4	RXD	RS232 receiving port
5	GND	Signal ground





#### Communication cable connection method

Computer terminal (9-pin female)	Drive terminal (6-pin RJ)
3 TXD	 4 RXD
2 RXD	 3 TXD
5 GND	 5/2 GND



# 2.2 Dial function description

## 2.2.1 Station number setting

Station number	SW1	SW2	SW3	SW4	SW5	Station number	SW1	SW2	SW3	SW4	SW5
0	OFF	OFF	OFF	OFF	OFF	16	OFF	OFF	OFF	OFF	ON
1	ON	OFF	OFF	OFF	OFF	17	ON	OFF	OFF	OFF	ON
2	OFF	ON	OFF	OFF	OFF	18	OFF	ON	OFF	OFF	ON
3	ON	ON	OFF	OFF	OFF	19	ON	ON	OFF	OFF	ON
4	OFF	OFF	ON	OFF	OFF	20	OFF	OFF	ON	OFF	ON
5	ON	OFF	ON	OFF	OFF	21	ON	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF	OFF	22	OFF	ON	ON	OFF	ON
7	ON	ON	ON	OFF	OFF	23	ON	ON	ON	OFF	ON
8	OFF	OFF	OFF	ON	OFF	24	OFF	OFF	OFF	ON	ON
9	ON	OFF	OFF	ON	OFF	25	ON	OFF	OFF	ON	ON
10	OFF	ON	OFF	ON	OFF	26	OFF	ON	OFF	ON	ON
11	ON	ON	OFF	ON	OFF	27	ON	ON	OFF	ON	ON
12	OFF	OFF	ON	ON	OFF	28	OFF	OFF	ON	ON	ON
13	ON	OFF	ON	ON	OFF	29	ON	OFF	ON	ON	ON
14	OFF	ON	ON	ON	OFF	30	OFF	ON	ON	ON	ON
15	ON	ON	ON	ON	OFF	31	ON	ON	ON	ON	ON

## 2.2.2 Baud rate setting

SW7	SW6	Baud rate
OFF	OFF	1Mbps
OFF	ON	500Kbps
ON	OFF	250Kbps
ON	ON	125Kbps

#### 2.2.3 Terminal resistance

SW8	Terminal resistance
OFF	Noneffective
ON	Effective



# Chapter III Description of Communication Control

#### 3.1 Control mode

Each drive of this series supports 3 control modes, which can be set through Object 6060h. The current control mode the drive can be monitored through Object 6061h.

Index	Subindex	Name	Parameter value	Data Type	Property
6060h	00	Operating mode	1: Position mode; 3: Velocity mode; 4: Torque mode; 6: Homing mode;	INTEGER8	RW

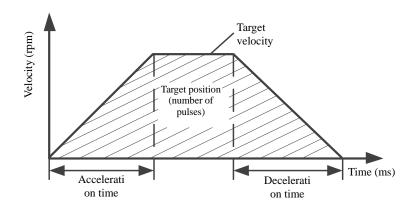
## 3. 2 Profile position mode

#### 3.2.1 Related parameters

Index	Subindex	Name	Setting range	Data Type	Property
6040h	00	Control command word	$0 \sim 65535$	UNSIGNED16	RW
6060h	00	Operating mode setting	1,3,4,6	INTEGER8	RW
607Ah	00	Target position	-1000000 ∼ +1000000	INTEGER32	RW
6081h	00	Target velocity (rpm)	$0\sim3000$	UNSIGNED32	RW
6083h	00	Acceleration time (ms)	$0\sim 2000$	UNSIGNED32	RW
6084h	00	Deceleration time (ms)	$0\sim 2000$	UNSIGNED32	RW
2300h	00	Electronic gear numerator	0 ∼ 65535	UNSIGNED16	RW
2301h	00	Electronic gear denominator	0 ∼ 65535	UNSIGNED16	RW
6041h	00	Status word		UNSIGNED16	RO
6061h	00	Operating mode monitoring		INTEGER8	RO
6064h	00	Current position		INTEGER32	RO

#### 3.2.2 Description of position mode

The motion parameters can be given by the CANopen bus position mode through the master station, which are: target position (607Ah-00), target velocity (6081h-00), acceleration time (6083h-00), deceleration time (6084h-00), and then the motion path can be established by the drive according to these parameters to achieve accurate position control. The motion curve is shown in the following figure:





#### 3.2.3 Description of control steps

- 1. First, set the operating mode (6060h-00) to 1, and then set the monitoring operating mode (6061h-00) to 1, indicating that it is in the position mode;
- 2. Write 6, 7 and 15 into the control word in turn at an interval of about 10ms. After writing, the motor can be enabled:
- 3. Write the motion parameters into the target position (607Ah-00), target velocity (6081h-00), acceleration time (6083h-00) and deceleration time (6084h-00);
- 4. Enable motor running through Bit4-Bit6 of the control word (6040h-00). See the following for the description of the control word:

Control bit of the command word	Function description	
Bit4	1: Enabling a new target position (rising edge triggered)	
Bit5	Updating motion parameters after completing the current position curve;     1: Updating motion parameters immediately.	
Bit6	0: Absolute positioning mode; 1: Relative positioning mode.	

Table of control word values:

Command word (6040h-00) setting value (decimal)	Description
6->7->15	Yes
15->31	Enabling absolute positioning (under position mode)
15->95	Enabling relative positioning (under position mode)
15->63	Performing absolute positioning immediately according to the new motion parameters.
15->127	Performing relative positioning immediately according to the new motion parameters.
15->11	Emergency stop

5. The current status of the drive can be monitored through the status word (6041h-00), see the following table:

Corresponding bits of the status word	Description
Bit0~Bit2	When 6040=0, the corresponding bit of 6041 is 000 When 6040=6, the corresponding bit of 6041 is 001 When 6040=7, the corresponding bit of 6041 is 011 When 6040=15, the corresponding bit of 6041 is 111
Bit7	0: Drive ready 1: Drive alarm
Bit8	0: Homing not completed 1: Homing completed
Bit10	0: Motor in operating 1: Motor velocity: 0
Bit12	0: Target position to be effective 1: Target position, effective
Bit15	0: Position mode not in place 1: Position mode positioning completed



## 3.3 Profile velocity mode

#### 3.3.1 Related parameters

Index	Subindex	Name	Setting range	Data Type	Property
6040h	00	Control command word	$0\sim 65535$	UNSIGNED16	RW
6060h	00	Operating mode setting	1,3,4,6	INTEGER8	RW
60FFh	00	Target velocity (rpm)	$0\sim3000$	UNSIGNED32	RW
6083h	00	Acceleration time (ms)	$0\sim 2000$	UNSIGNED32	RW
6084h	00	Deceleration time (ms)	$0\sim 2000$	UNSIGNED32	RW
6041h	00	Status word		UNSIGNED16	RO
6061h	00	Operating mode		INTEGERO	D.O.
		monitoring		INTEGER8	RO

#### 3.3.2 Description of control steps

- 1. First, set the operating mode (6060h-00) to 3, and then set the monitoring operating mode (6061h-00) to 3, indicating that it is in the velocity mode;
- 2. Write the motion parameters into the target velocity (60FFh-00), acceleration time (6083h-00) and deceleration time (6084h-00);
- 3. Write 6, 7 and 15 into the control word in turn at an interval of about 10ms. After writing, the motor can be enabled and operated;

#### 3.4 Profile torque mode

#### 3.4.1 Related parameters

Index	Subindex	Name	Setting range	Data Type	Property
6040h	00	Control command word	$0\sim 65535$	UNSIGNED16	RW
6060h	00	Operating mode setting	1,3,4,6	INTEGER8	RW
6071h	00	Target torque	-32768 ∼ 32767	INTEGER16	RW
6072h	00	Target torque limit	-32768 ∼ 32767	INTEGER16	RW
6087h	00	Torque gradient	$0\sim 65535$	UNSIGNED32	RW
2406h	00	Velocity limit under torque mode	$0\sim 65535$	UNSIGNED16	RW
6077h	00	Feedback torque		INTEGER16	RO
6041h	00	Status word		UNSIGNED16	RO
6061h	00	Operating mode monitoring		INTEGER8	RO

#### 3.4.2 Description of control steps

- 1. First, set the operating mode (6060h-00) to 4, and then set the monitoring operating mode (6061h-00) to 4, indicating that it is in the torque mode;
- 2. Write the motion parameters into the target torque (6071h-00), torque limit (6072h-00), torque gradient (6087h-00) and torque velocity limit (2406h-00);
- 3. Write 6, 7 and 15 into the control word in turn at an interval of about 10ms. After writing, the motor can be enabled and then operated;



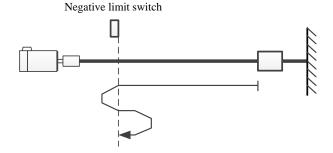
#### 3.5 Homing mode

#### 3.5.1 Related parameters

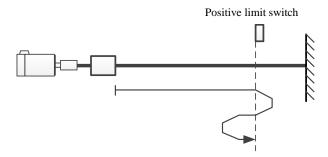
Index	Subindex	Name	Setting range	Data Type	Property
6040h	00	Control command word	$0\sim 65535$	UNSIGNED16	RW
6060h	00	Operating mode setting	1,3,4,6	INTEGER8	RW
6098h	00	Homing mode	Standard 1~14, 17~30 and 33~35 modes	UNSIGNED8	RW
6099h	01	Homing velocity (rpm)	$0 \sim 3000$	UNSIGNED32	RW
6099h	02	Homing creep time (rpm)	$0\sim3000$	UNSIGNED32	RW
609Ah	00	Acceleration / deceleration time (ms)	$0\sim 2000$	UNSIGNED32	RW
607Ch	00	Homing offset	-1000000 ∼ +1000000	INTEGER32	RW
6041h	00	Status word		UNSIGNED16	RO
6061h	00	Operating mode monitoring		INTEGER8	RO

#### 3.5.2 Description of homing mode

**1. Negative limit mode** (6098h=17): After homing is allowed, the motor will run in the negative direction at the homing velocity (6099h-01). It will decelerate and stop when the negative limit switch is sensed, then it will run in the positive direction at the homing velocity (6099h-01) for a certain distance and decelerate and stop. Then it will run in the negative direction at a homing creep velocity (6099h-02). When the negative limit switch is sensed, the motor will stop, indicating that the homing operation is completed.



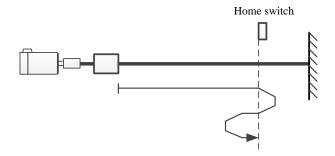
**2. Positive limit mode** (6098h=18): After homing is allowed, the motor will run in the positive direction at the homing velocity (6099h-01). It will decelerate and stop when the positive limit switch is sensed, then it will run in the negative direction at the homing velocity (6099h-01) for a certain distance and decelerate and stop. Then it will run in the positive direction at a homing creep velocity (6099h-02). When the positive limit switch is sensed, the motor will stop, indicating that the homing operation is completed.



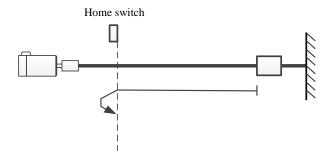
**3. Positive origin mode** (6098h=24): After homing is allowed, the motor will run in the positive direction at the homing velocity (6099h-01). It will decelerate and stop when the origin switch is sensed, then it will run in the negative direction at the homing velocity (6099h-01) for a certain distance and decelerate and stop. Then it will run in the positive direction at a homing creep velocity (6099h-02). When the origin switch is sensed, the



motor will stop, indicating that the homing operation is completed.



**4.** Negative origin mode (6098h=29): After homing is allowed, the motor will run in the negative direction at the homing velocity (6099h-01). It will decelerate and stop when the origin switch is sensed. Then it will run in the positive direction at a homing creep velocity (6099h-02). When leaving the origin switch is sensed, the motor will stop, indicating that the homing operation is completed.



#### 3.4.3 Description of control steps

- 1. First, set the operating mode (6060h-00) to 6, and then set the monitoring operating mode (6061h-00) to 6, indicating that it is in the homing mode;
- 2. Write 6, 7 and 15 into the control word in turn at an interval of about 10ms. After writing, the motor can be enabled:
- 3. Write the homing parameters into the homing mode (6098h-00), homing velocity (6099h-01), homing creep velocity (6099h-02), acceleration / deceleration time (609Ah-00);
- 4. Enable homing through Bit4 of the control word (6040h-00). See the following:

Control bit of the command word	Function description	
Bit4	0->1: Starting homing; 1->0: Stopping homing;	

5. The current status of the drive can be monitored through the status word (6041h-00), see the following table:

Corresponding bits of the status word	Name	Description
Bit8	Homing status	0: Homing not completed 1: Homing completed
Bit10	Motion status	0: Motor in operating 1: Motor velocity: 0

## 3.6 Other common functions

#### 3.6.1 Clearing current position

When the value in Index 2200h-00 changes from 0 to 1, the current position value will be cleared to zero, which



should be manually set to 0. This operation can be performed through the SDO-command.

#### 3.6.2 Saving parameters

When 1 is written into Index 2201h-00 through SDO, the current parameters of the drive will be saved. This operation is often used to save parameters such as homing velocity, acceleration/deceleration and homing mode.

#### 3.6.2 Alarm reset

Set Bit7 of Control Word 6040h-00 to 1 to reset the drive alarm. It should be set to 0 manually.

## **Chapter IV Description of Object Dictionary and Parameter**

## 4.1 Object dictionary

#### **4.1.1 1000h group objects**

Index	Subind ex	Register address	Meaning	Description	Property	Data Type
1000	00		Device type	This device supports CIA301 and CIA402 protocols	(RO)	U32
1009	00		Hardware version	Hardware version	(RO)	U16
100A	00		Software version	Software version	(RO)	U16
	00				(RW)	U8
	01		Receive PDO 1		(RW)	U32
1600	02		Mapping	Receive PDO 1 Mapping	(RW)	U32
	03		Mapping		(RW)	U32
	04				(RW)	U32
	00				(RW)	U8
	01		Receive PDO 2		(RW)	U32
1601	02		Mapping	Receive PDO 2 Mapping	(RW)	U32
	03		Wapping		(RW)	U32
	04				(RW)	U32
	00				(RW)	U8
	01		D : DDO 2		(RW)	U32
1602	02		Receive PDO 3 Mapping	Receive PDO 3 Mapping	(RW)	U32
	03		Wapping		(RW)	U32
	04				(RW)	U32
	00				(RW)	U8
	01		Receive PDO 4		(RW)	U32
1603	02		Mapping	Receive PDO 4 Mapping	(RW)	U32
	03		Mapping		(RW)	U32
	04				(RW)	U32
	00				(RW)	U8
	01		T '.DD 0 1		(RW)	U32
1A00	02		TransmitPDO 1 Mapping	TransmitPDO 1 Mapping	(RW)	U32
	03		wapping		(RW)	U32
	04				(RW)	U32
	00				(RW)	U8
	01		T '4DDC 2		(RW)	U32
1A01	02		TransmitPDO 2 Mapping	TransmitPDO 2 Mapping	(RW)	U32
	03		wiapping		(RW)	U32
	04				(RW)	U32
	00				(RW)	U8
	01		T'(DDO 2		(RW)	U32
1A02	02		TransmitPDO 3 Mapping	TransmitPDO 3 Mapping	(RW)	U32
	03		wiapping		(RW)	U32
	04				(RW)	U32



	00				(RW)	U8
1A03	01		TransmitPDO 4 Mapping	TransmitPDO 4 Mapping	(RW)	U32
	02				(RW)	U32
	03				(RW)	U32
	04				(RW)	U32

## **4.1.2 Factory defined 2000h parameters**

Index	Subindex	Register address	Meaning	Descr	ription	Property	Range
2000	00	0x0000	Device information	Device in	formation	RO	-
2001	00	0x0001	Software version	Software	e version	RO	-
2100	00	0x0006	DI group terminal status	Code Bit0 Bit1 Bit2 Bit3 Bit4 Bit5 Bit6	Status     DI0     DI1     DI2     DI3     DI4     DI5     DI6	RO	-
2101	00	0x0007	DO group terminal status	Code Bit0 Bit1 Bit2	Status DO0 DO1 DO2	RO	-
2102	00	0x0008	Drive error code	1001: Ov 1002: Und 1003: Encoder H 1004: U-phas 1005: V-phas 1006: W-phas 1007: O 1008: Position o 1009: U-phase curre 1010: V-phase curre 1011: Bus voltage 1012: EEPRO	ercurrent; ervoltage; dervoltage; ALL signal error; e overcurrent; e overcurrent; everload; out-of-tolerance; ent calibration error; e calibration error; M writing error;	RO	-
2200	00	0x0061	Clear current position		ffective; lear;	RW Effective immediately	-
2201	00	0x0063	Parameter saving		ffective; ective;	RW Effective immediately	-
2202	00	0x0064	Factory parameter restoring		ffective; ective;	RW Effective immediately	-
2203	00	0x0062	Alarm clearing	0: Noneffective; 1: Clear;		RW Effective immediately	-
2300	00	0x0067	Electronic gear numerator	Electronic gear numerator		RW Effective after power-on	-
2301	00	0x0068	Electronic gear denominator	Electronic gea	ır denominator	RW Effective after power-on	-



2302	00	0x0069	Default direction		efault;	RW Effective after	_
				1: Ne	egative;	power-on	
				C 1	g, ,	•	
				Code Bit0	Status DI0		
						RW	
2400	01	00006	Input terminal	Bit1	DI1	Effective after	
2400	01	0x0086	polarity	Bit2	DI2	release and	-
				Bit3	DI3	writing	
				Bit4	DI4		
				0: Normally open	; 1: Normally closed		
						RW	
2400	02	0x0087	DI Input Port 0			Effective	-
						immediately	
				Code	Functions	RW	
2400	03	0x0088	DI Input Port 1	0x00	N/A	Effective	-
				0x01	Origin signal	immediately	
				0x02	Positive limit	RW	
2400	04	0x0089	DI Input Port 2	0x03	Negative limit	Effective	-
				0x04	Signal release	immediately	
				0x05	Signal stop	RW	
2400	05	0x008A	DI Input Port 3	0x06	Forced	Effective	-
					emergency stop	immediately	
						RW	
2400	06	0x008B	DI Input Port 4			Effective	-
						immediately	
			I			RW	
2400	2400 07 0	0x0081	Input terminal	Input term	inal filtering	Effective	-
			filtering		C	immediately	
				Code	Status		
				Bit0	DO0	RW	
2400	0C	0x008C	Output terminal	Bit1	DO1	Effective	
2400	00	UNUUUC	polarity	Bit2	DO2	immediately	_
					; 1: Normally closed	Ininiculatory	
				o. Normany open,	, 1. Normany closed		
	0.75			Code	Functions	RW	
2400	0D	0x008D	DO Output Port 0	0x00	N/A	Effective	-
				0x01		immediately	
					Alarm output	RW	
2400	0E	0x008E	DO Output Port 1	0x02	Motor running	Effective	-
				0x03	Homing completed	immediately	
				0x04	In-place signal		
				0x04	Z signal		
					Signal of internal	RW	
2400	0F	0x008F	DO Output Port 2	0x06	contracting brake	Effective	_
2 700	01	OAGOOI	20 Output I oft 2	0x09	User Definition 0	immediately	
				0x09 0x0A	User Definition 1	ininiculatory	
					User Definition 2		
				0x0B	Oser Definition 2		
			Onanina dalam ef			RW	
2401	00	0x006A	Opening delay of	Opening delay	of brake, unit: ms	Effective after	-
			brake			power-on	
			Closing dalay of			RW	
2402	00	0x006B	Closing delay of	Closing delay	of brake, unit: ms	Effective after	-
			brake	5	: 	power-on	
			D. I. C.			RW	
2403	00	0x006C	Relief opening	Relief opening thr	eshold, unit: 0.001V	Effective after	-
			threshold		,	power-on	
			D 11 6 1 1			RW	
2404	00	0x006D	Relief closing	Relief closing thre	eshold, unit: 0.001V	Effective after	-
			threshold	Relief closing threshold, unit: 0.001V		power-on	
			·				



2405   00   0x0083   Software limit   Software limit   Software limit   Software after homing   Freetive   Interesting   Freetive   Interesting   Freetive   Interesting   Freetive   Interesting   Freetive   Interesting   Int						RW																										
2406   00   0x0085	2405	00	0v0083				_																									
2406   00   0x0085   velocity limit under torque mode   Unit: ppm   Effective after release and writing   RW   Effective after release and writing   Effective after release and writing   Effective after release and writing   RW   Effectiv	2403	00	0.00003	switch	1: Effective after homing		-																									
2406   00																																
2500   00   0x0076   0x0076   0x0076   0x0076   0x0076   0x0076   0x0076   0x0076   0x0076   0x0077				Volocity limit																												
2500   00   0x0076   Out-of-tolerance threshold   Unit: pulse   Effective after release and writing   RW   Effective after release and writing   Effective after release	2406	00	0x0085		Unit: rpm		-																									
2500   00   0x0076   Out-of-tolerance threshold   Unit: pulse   Effective after release and writing   RW   File (City after release and writing   File (City after release and writ				under torque mode																												
2500   00   0x0076   Out-of-tolerance threshold   Unit: pulse   Effective after release and writing   RW   Effective after release and writing   Effective after release and writing   RW   Effective after release and writing   Effective after release and																																
2501   00   0x0070   0x0070   0x0070   0x0070   0x0070   0x0070   0x0071   0x0070   0x0071   0x0070   0x0071				0																												
2501   00   0x0070   In-place error   Unit: pulse   Effective after release and writing   RW	2500	00	0x0076		Unit: pulse		-																									
2501   00   0x0070   In-place error   Unit: pulse   Effective after release and writing   RW				threshold	1																											
2501   00   0x0070   In-place error   Unit: pulse   Effective after release and writing   RW																																
2502   00   0x0070   In-place error   Unit: ms   release and writing   RW   Effective after release and writing   Effective after rele																																
2502   00   0x0071   In-place time	2501	00	0x0070	In-place error	Unit: pulse		_																									
2502   00	2301	00	0.0070	in place error	Cinc. puise																											
2502   00																																
2502   00   0x0071   In-place time						RW																										
2503   00   0x002F   Max. bus voltage	2502	00	00071	In place time	Unit: ma	Effective after																										
2503   00   0x002F   Max. bus voltage	2302	00	0.0071	m-place time	Offit. Ins	release and	-																									
2503   00   0x002F   Max. bus voltage						writing																										
2505   00   0x0030   Min. bus voltage   Unit: 0.001V   Felease and writing   RW																																
2504   00	2502	00	0.000	3.6 1 1	11 1/2 0 00111	Effective after	0000																									
2504   00   0x0030   Min. bus voltage	2503	00	0x002F	Max. bus voltage	Unit: 0.001 V	release and	8000																									
2504   00   0x0030   Min. bus voltage																																
2504   00   0x0030   Min. bus voltage   Unit: 0.001V   Effective after release and writing   RW																																
2505   00   0x0031   Max. phase current   Unit: 0.1% p.u.   Effective after release and writing   RW																																
2505   00   0x0031   Max. phase current   Unit: 0.1% p.u.   Effective after release and writing   RW	2504	00	0x0030	Min. bus voltage	Unit: 0.001V		1800																									
2505   00   0x0031   Max. phase current   Unit: 0.1% p.u.   Effective after release and writing   RW   Effective after release and writing																																
2505 00 0x0031 Max. phase current Unit: 0.1% p.u. Effective after release and writing RW  2506 00 0x0032 Max. continuous line current Unit: 0.1% p.u. Effective after release and writing RW  2508 00 0x0034 Position loop output limit Unit: rpm Effective after release and writing RW  2509 00 0x0035 Velocity loop output limit Unit: 0.1% rated current Effective after release and writing RW  2500 Unit: 0.1% rated current Effective after release and writing RW  2500 Effective after release and writing RW																																
2505   00   0x0031   current   Unit: 0.1% p.u.   release and writing   RW				May phace																												
2506   00   0x0032   Max. continuous line current   Unit: 0.1% p.u.   Effective after release and writing   RW	2505	00	0x0031	-	Unit: 0.1% p.u.		2500																									
2506   00   0x0032   Max. continuous line current   Unit: 0.1% p.u.   Effective after release and writing   RW				Current																												
2506   00   0x0032   Max. continuous line current   Unit: 0.1% p.u.   Effective after release and writing   RW																																
2506   00   0x0032   line current   Unit: 0.1% p.u.   release and writing   RW				M																												
2508 00 0x0034 Position loop output limit  2509 00 0x0035 Velocity loop output limit  2500 00 0x0035 Velocity loop output limit  2500 00 0x0036 d-axis current loop limit  2500 00 0x0037 Voltage vector limit  2500 00 0x004 Load inertia ratio  2500 00 0x004 Rigidity coefficient  2500 0x004 Rigid	2506	00	0x0032		Unit: 0.1% p.u.		2500																									
2508 00 0x0034 Position loop output limit  2509 00 0x0035 Velocity loop output limit  2500 00 0x0035 Velocity loop output limit  2500 00 0x0036 Velocity loop output limit  2500 00 0x0037 Velocity loop output limit  2500 00 0x0048 Load inertia ratio  2500 00 0x0048 Load inertia ratio  2500 00 0x0048 Rigidity coefficient 0 100%; RW Effective after release and writing  - RW Effective after release and writing				line current	*																											
2508 00 0x0034 Position loop output limit  2509 00 0x0035 Velocity loop output limit  2500 00 0x0035 Velocity loop output limit  2500 00 0x0035 Velocity loop output limit  2500 00 0x0036 Velocity loop output limit  2500 00 0x0036 Velocity loop output limit  2500 00 0x0036 Velocity loop output limit  2500 00 0x0037 Velocity loop output limit  2500 00 0x0037 Velocity loop output limit  2500 00 0x0037 Velocity loop output limit  2500 00 0x0048 Load inertia ratio  2500 00 0x0048 Rigidity coefficient  2500 00 0x0044 Rigidity coefficient  2500 00 0x0044 Rigidity coefficient  2500 00 0x0044 Rigidity coefficient  2500 0x0044 Rigidity coefficient  2500 0x0044 Rigidity coefficient  2500 0x0045 Rigidity coefficient  2500 0x0046 Rigidity coefficient  2500 0x0046 Rigidity coefficient  2500 0x0046 Rigidity coefficient  2500 0x0046 Rigidity coefficient  2500 0x0047 Rigidity coefficient  2500 0x0048 Rigidity coefficient  2500																																
2508 00 0x0034 output limit Unit: rpm release and writing  2509 00 0x0035 Velocity loop output limit Unit: 0.1% rated current Effective after release and writing  250A 00 0x0036 d-axis current loop limit Unit: 0.1% p.u. voltage  250B 00 0x0037 Voltage vector limit Unit: 0.1% p.u. voltage  250C 00 0x0048 Load inertia ratio Load inertia ratio  250D 00 0x004A Rigidity coefficient 0: 100%; Effective after release and writing  RW  Effective after release and writing																																
2509 00 0x0035 Velocity loop output limit  250A 00 0x0036 Velocity loop output limit  250A 00 0x0036 Velocity loop output limit  250B 00 0x0037 Voltage vector limit  250B 00 0x0048 Load inertia ratio  250B 00 0x0048 Rigidity coefficient  250D 00 0x004A Rigidity coefficient  250D 00 0x004A Rigidity coefficient  250B 00 0x004A Rigidity coeffici	2508	00	0x0034		Unit: rpm		4500																									
2509 00 0x0035 Velocity loop output limit  Unit: 0.1% rated current  Effective after release and writing  RW Effective after release and writing  Effective after release and writing  RW Effective after release and writing  RW Effective after release and writing				output limit		release and																										
250A 00 0x0035 Velocity loop output limit Unit: 0.1% rated current Effective after release and writing  250A 00 0x0036 d-axis current loop limit Unit: 0.1% p.u. voltage  250B 00 0x0037 Voltage vector limit Unit: 0.1% p.u. voltage  250C 00 0x0048 Load inertia ratio Load inertia ratio  250C 00 0x004A Rigidity coefficient 0: 100%; Effective after release and writing  RW  Effective after release and writing				1																												
250A 00 0x0035 output limit Unit: 0.1% rated current release and writing  250A 00 0x0036 d-axis current loop limit  250B 00 0x0037 Voltage vector limit  250C 00 0x0048 Load inertia ratio  250D 00 0x004A Rigidity coefficient  250D 00																																
250A 00 0x0036 d-axis current loop limit Unit: 0.1% p.u. voltage Effective after release and writing RW  250B 00 0x0037 Voltage vector limit Unit: 0.1% p.u. voltage Effective after release and writing RW  250C 00 0x0048 Load inertia ratio Load inertia ratio Effective after release and writing  RW  Effective after release and writing	2509	00	0x0035		Unit: 0.1% rated current		2000																									
250A 00 0x0036 d-axis current loop limit Unit: 0.1% p.u. voltage  250B 00 0x0037 Voltage vector limit Unit: 0.1% p.u. voltage  250C 00 0x0048 Load inertia ratio  250D 00 0x004A Rigidity coefficient 0: 100%;  250D 00 0x004A Rigidity coefficient 0: 100%;	2507	00	0.0000	output limit	onic. 6.170 rated earrence		2000																									
250A 00 0x0036 d-axis current loop limit Unit: 0.1% p.u. voltage Effective after release and writing  250B 00 0x0037 Voltage vector limit Unit: 0.1% p.u. voltage Effective after release and writing  250C 00 0x0048 Load inertia ratio Load inertia ratio  RW Effective after release and writing  RW Effective after release and writing  RW Effective after release and writing  Rigidity coefficient  0: 100%; 1: 80%; 2: 75%;  Effective after release and writing  RW Effective after release and writing																																
250B 00 0x0036 limit Unit: 0.1% p.u. voltage release and writing RW  250B 00 0x0037 Voltage vector limit Unit: 0.1% p.u. voltage  250C 00 0x0048 Load inertia ratio Load inertia ratio  Rigidity coefficient 0: 100%;  Rigidity coefficient 0: 100%;  250D 00 0x004A Rigidity coefficient 0: 100%;  250D 0																																
250B 00 0x0037 Voltage vector limit Unit: 0.1% p.u. voltage  250C 00 0x0048 Load inertia ratio  RW Effective after release and writing  Rigidity coefficient  0: 100%; 1: 80%; Effective after release and writing  RW Effective after release and writing  250D 00 0x004A Rigidity coefficient  2: 75%;	2504	00	0v0036	d-axis current loop	Unit: 0.1% n.u. voltage		500																									
250B 00 0x0037 Voltage vector limit Unit: 0.1% p.u. voltage  Effective after release and writing  RW  Effective after release and writing  Rigidity coefficient  0: 100%;  RW  Effective after release and writing  Rigidity coefficient  0: 100%;  Effective after release and writing  Effective after release and writing	230A	00	0.00000	limit	Omt. 0.1 % p.u. voltage		300																									
250B 00 0x0037 Voltage vector limit Unit: 0.1% p.u. voltage Effective after release and writing RW  250C 00 0x0048 Load inertia ratio Load inertia ratio Effective after release and writing  Rigidity coefficient  0: 100%; Rigidity coefficient  0: 100%; Effective after release and writing  RW  Effective after release and writing  RW  Effective after release and writing																																
250C 00 0x0048 Load inertia ratio Load inertia ratio  RW Effective after release and writing  Rigidity coefficient  0: 100%; 1: 80%; 250D 00 0x004A Rigidity coefficient 2: 75%;  Coefficient  Contr. 0.1% p.u. Voltage  release and writing  RW Effective after release and writing						RW																										
250C 00 0x0048 Load inertia ratio Load inertia ratio  RW Effective after release and writing  Rigidity coefficient  0: 100%; 1: 80%; 250D 00 0x004A Rigidity coefficient 2: 75%;  Coefficient  Contr. 0.1% p.u. Voltage  release and writing  RW Effective after release and writing	2500	00	0x0027	Voltage vector	I Init, O 10/	Effective after	000																									
250C 00 0x0048 Load inertia ratio Load inertia ratio Effective after release and writing  RW Effective after release and writing  Rigidity coefficient 0: 100%; 1: 80%	230B	UU	UXUU3/		Unit: 0.1% p.u. voitage	release and	900																									
250C 00 0x0048 Load inertia ratio Load inertia ratio  Load inertia ratio  RW Effective after release and writing  Rigidity coefficient 0: 100%; 1: 80%; 2: 75%;  RW Effective after release and writing  RW Effective after release and writing						writing																										
250C 00 0x0048 Load inertia ratio Load inertia ratio Effective after release and writing  Rigidity coefficient 0: 100%;  Ox004A Rigidity coefficient 0: 100%;  1: 80%;  250D 250D 00 0x004A Rigidity coefficient 2: 75%;  RW  Effective after release and writing																																
250C 00 0x0048 Load inertia ratio Load inertia ratio release and writing  Rigidity coefficient 0: 100%; RW Coefficient 1: 80%; Effective after release and writing 2: 75%; writing																																
250D 00 0x004A Rigidity coefficient 0: 100%; RW Effective after release and writing 2: 75%; writing	250C	00	0x0048	Load inertia ratio	Load inertia ratio		-																									
250D 00 0x004A Rigidity coefficient 0: 100%; RW Effective after release and writing																																
250D 00 0x004A Rigidity coefficient 0: 100%; RW Effective after release and writing					Rigidity coefficient																											
250D 00 0x004A Rigidity coefficient 1: 80%; Effective after release and writing						RW																										
250D 00 0x004A coefficient 1: 80%; release and writing	0500	00		Rigidity			_																									
2: 75%; writing	2500	00		00 0x004A				-																								
3: 50%;																																
					3: 50%;																											



# 4.1.3 6000h group objects

Index	Subindex	Register address	Meaning	Description	Property	Range
603F	00	0x0200	603F mapping	603F mapping	RO	-
6040	00	0x0201	Control command	Control word	RW Effective immediately	-
6041	00	0x0202	6041 mapping	6041 mapping	RO	-
6060	00	0x0204	Operating mode	1: Position mode; 3: Velocity mode; 4: Torque mode; 6: Homing mode;	RW Effective immediately	-
6061	00	0x0205	Operating mode display	6061 mapping	RO	-
		0x0206	Current position H	Unit: pulse	RO	-
6064	00	0x0207	Current position L	Unit: pulse	RO	-
(0)(0	00	0x0208	Current velocity H	Unit: rpm	RO	-
606C	00	0x0209	Current velocity L	Unit: rpm	RO	-
607A 00	0x020A	Target position H under position mode	Unit: pulse	RW Effective immediately	-	
		0x020B	Target position L under position mode	Unit: pulse	RW Effective immediately	-
6081 00	00	0x020C	Target velocity H under position mode	Unit: rpm	RW Effective immediately	-
0001	00	0x020D Target velocity L under position mode		Unit: rpm	RW Effective immediately	-
6083	00	0x020E	Acceleration time H under position mode	Unit: ms	RW Effective immediately	-
0083	00	0x020F Acceleration time L under position mode		Unit: ms	RW Effective immediately	-
6084	00	0x0210	Deceleration time H under position mode	Unit: ms	RW Effective immediately	-
0064	00	0x0211	Deceleration time L under position mode	Unit: ms	RW Effective immediately	-
60FF	00	0x0212	Target velocity H under velocity mode	Unit: rpm	RW Effective immediately	-
OUFF	00	0x0213	Target velocity L under velocity mode	Unit: rpm	RW Effective immediately	-
6098	00	0x0214	Homing mode	Standard 1~14, 17~30 and 33~35 modes	RW Effective immediately	-
6000	0.1	0x0215	Homing velocity H	Unit: rpm	RW Effective immediately	-
6099	01	0x0216	Homing velocity L	Unit: rpm	RW Effective immediately	-
6099	02	0x0217	Queried homing velocity H	Unit: rpm	RW Effective immediately	-
ひひみみ	02	0x0218	Queried homing velocity L	Unit: rpm	RW Effective immediately	-



100.1		0x0219	Homing acceleration / deceleration H	Unit: ms	RW Effective immediately	-
609A	00	0x021A	Homing acceleration / deceleration L	Unit: ms	RW Effective immediately	-
		0x021B	Homing offset H	Unit: pulse	RW Effective immediately	-
607C	00	0x021C	Homing offset L	Unit: pulse	RW Effective immediately	-
607D	0.1	0x021D	Positive software limit H	Unit: pulse	RW Effective immediately	-
607D 01	0x021E	Positive software limit L	Unit: pulse	RW Effective immediately	-	
607D 02	0x021F	Negative software limit H	Unit: pulse	RW Effective immediately	-	
	0x0220	Negative software limit L	Unit: pulse	RW Effective immediately	-	
6071	00	0x0221	Target torque	Unit: 0.1% p.u.	RW Effective immediately	-
6072	00	0x0222	Target torque limit	Unit: 0.1% p.u.	RW Effective immediately	-
6077	00	0x0223	Feedback torque	Unit: 0.1% p.u.	RW Effective immediately	-
500 <b>5</b>	0.0	0x0224	Torque gradient H	Unit: 0.1% p.u.	RW Effective immediately	-
6087	00	0x0225	Torque gradient L	Unit: 0.1% p.u.	RW Effective immediately	-
COED	00	0x0226	60FD mapping	Bit0: Negative limit;	RW Effective immediately	-
60FD	00	0x0227	60FD mapping	Bit1: Positive limit; Bit2: Origin;	RW Effective immediately	-
60	0.1	0x0228	60FE 01 mapping	Di	RW Effective immediately	-
60FE	01	0x0229	60FE 01 mapping	Physical output	RW Effective immediately	-
	22	0x022A	60FE 02 mapping		RW Effective immediately	-
60FE	02	0x022B	60FE 02 mapping	Output shield	RW Effective immediately	-



## **4.2.1 Motor parameters**

No.	Register address	Meaning	Description	Property	Range
PA_02	0x0002	Motor model	1: 100W-2500 motors; 2: 200W-2500 motors; 3: 400W-2500 motors; 4: 750W-2500 motors;	RW	1
PA_18	0x0018	Rated power	Unit: W;	RW is effective after power-on	-
PA_19	0x0019	Rated voltage	Unit: 0.001V	RW is effective after power-on	-
PA_1A	0x001A	Rated current	Unit: 0.001A	RW is effective after power-on	-
PA_1B	0x001B	Rotating velocity	Unit: rpm	RW is effective after power-on	-
PA_1C	0x001C	Rated torque	Unit: 0.001Nm	RW is effective after power-on	-
PA_1D	0x001D	Peak torque	Unit: 0.001Nm	RW is effective after power-on	-
PA_1E	0x001E	Line inductance	Unit: 0.001mH	RW is effective after power-on	-
PA_1F	0x001F	Line resistance	Unit: 0.001 Ω	RW is effective after power-on	-
PA_20	0x0020	Rotational inertia	Unit: Kg.m2×10e-7	RW is effective after power-on	-
PA_21	0x0021	Torque coefficient	Unit: mN.m/Arms	RW is effective after power-on	-
PA_22	0x0022	Back EMF coefficient	Unit: V/rpm	RW is effective after power-on	-
PA_24	0x0024	Number of pole pairs	Default 5-pole-pair motor	RW is effective after power-on	-
PA_25	0x0025	Number of encoder lines	Default 2500-line motor	RW is effective after power-on	-

## **4.2.2 Operating parameters**

	Register address	Meaning	Description	Property	Range
PA_2F	0x002F	Max. bus voltage	Unit: 0.001V	RW Effective after release and writing	8000
PA_30	0x0030	Min. bus voltage	Unit: 0.001V	RW Effective after release and writing	1800
PA_31	0x0031	Max. phase current	Unit: 0.1% p.u.	RW Effective after release and writing	2500
PA_32	0x0032	Max. continuous line current	Unit: 0.1% p.u.	RW Effective after release and writing	2500
PA_34	0x0034	Position loop output limit	Unit: rpm	RW Effective after release and writing	4500
PA_35	0x0035	Velocity loop output limit	Unit: 0.1% rated current	RW Effective after release and writing	2000
PA_36	0x0036	d-axis current loop limit	Unit: 0.1% p.u. voltage	RW Effective after release and writing	500

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PA_38 0x0038					DW	
PA_38   0x0038   Ist gain of position loop   Ist proportional gain of position proportional gain of position loop   Ist proportional gain of position position position proportional gain of position proportional gain proportional gain of position proportional gai	DA 37	0v0037	Voltage vector limit	Unit: 0.1% n.u. voltage		900
PA_38   0x0038   1st gain of position loop   1st proportional gain of position loop   2nd gain of position loop   2nd proportional p	PA_57	0x0057	voltage vector minit	Onit. 0.1% p.u. voltage		900
PA_38   0x0038   1st gain of position   1st proportional gain of position loop   1st proportional gain of position loop   2nd gain of position loop   2nd proportional gain of position loop   2nd gain of position loop   2nd proportional gain of position   2nd proportional gain of position loop   2nd proportional gain of position   2nd proportional gain   2nd proport						
PA_3B   0x003B   2nd gain of position loop   2nd proportional	DA 20	00020	1st gain of position	1 ot muomenties of acid of modition loop		
PA_3B	PA_38	000038		1st proportional gain of position loop		-
PA_3B   0x003B   2nd gain of position loop   2nd proportional gain of position loop   mimediately			•			
PA_3B   0x003B   Velocity feedforward coefficient of position loop   Effective immediately   Effective immediately   PA_3C   0x003C   Velocity feedforward loop-pass filtering bandwidth   Stagain of velocity loop   Streetive immediately   PA_3B   0x003B   Stagain of velocity   Stagain of velocity loop   Streetive immediately   Streetive imme			2nd gain of position			
Velocity feedforward coefficient of position loop   Velocity feedforward coefficient of position loop   Velocity feedforward loop   Velocity loop   Velocity feedforward loop   Velocity filtering	PA_39	0x0039		2nd proportional gain of position loop		-
PA_3B   0x003E   coefficient of position   loop   unit: 0.1%   minediately   minediate			-			
PA_3C   0x003C   Velocity feedforward low-pass filtering bandwidth   St gain of velocity loop   St integral of velocity loop				Velocity feedforward coefficient of position		
PA_3C 0x003C Velocity feedforward low-pass filtering bandwidth low-pass filtering bandwidth low-pass filtering bandwidth low-pass filtering bandwidth low-pass filtering loop	PA_3B	0x003B	coefficient of position			-
PA_3C   0x003C   low-pass filtering   bandwidth   loop   lst gain of velocity   loop   lst gain of velocity   loop   lst gain of velocity   loop   Effective   immediately   mediately   loop   lst gain of velocity   loop   Effective   immediately   loop   lst integral of velocity   loop   lst integral of velocity   loop   lst integral of velocity   loop   Effective   immediately   loop   Effective   loop   loop   lst integral of velocity   loop   lst integral of velocity   loop   lst integral of velocity   loop   Effective   limediately   loop   loop   loop   loop   lst integral of velocity   loop   lst integral   lst integral of velocity   loop   lst integral   lst integral of velocity   loop   lst integral   lst integr				100р, инт. 0.170		
PA_3D   0x003D   Sandwidth   Sandwidth   Sandwidth   PA_3D   0x003D   Sandwidth   Sandwidt				Valority foodforward love pass filtering		
PA_3D 0x003D Ist gain of velocity loop	PA_3C	0x003C	low-pass filtering		Effective after	-
PA_3E			bandwidth	unit. 112	release and writing	
PA_3E   0x003E   2nd gain of velocity   2nd gain of velocity   1st integral of velocity   1st integral of velocity   1st integral of velocity   1st integral of velocity   2nd integral of velocity   1st integral of velocity   1st integral of velocity   2nd integral of velocity   1st integral of velocity   2nd integral   2nd			1-4		RW	
PA_3E 0x003E   2nd gain of velocity loop   2nd gain of velocity loop   Effective immediately   RW   Effective immediately   Effective immediately   RW   Effective immediately   Effective immediately   RW   Effective immediately   Effective immediately   RW   Effective immediat	PA_3D	0x003D		1st gain of velocity loop	Effective	-
PA_3E  0x003E	_		loop		immediately	
PA_3E						
PA_3F 0x003F   1st integral of velocity   1st integral of velocity loop   2nd integral of velocity filtering bandwidth   2nd integral of velocity loop   2nd integral of velocity filtering loop   2nd integral of velocity loop   2nd integral of velocity loop   2nd integral of velocity filtering loop   2nd integral of velocity loop   2nd integral of velocity filtering loop   2nd integral of velocity loop   2nd int	PA 3E	0x003E	-	2nd gain of velocity loop		_
PA_40 0x0040	111_01	0.10001	loop	д 12 12222 100р		
PA_40 0x0040   St integral of velocity loop   St integral of velocity filtering bandwidth   St integral of velocity loop   S						
PA_40 0x0040 2nd integral of velocity loop 2nd integral 2nd integral of velocity loop 2nd integral 2nd i	PΔ 3E	0x003E	1st integral of velocity	1st integral of velocity loop		_
PA_40 0x0040 2nd integral of velocity loop 2nd integral of velocity loop 4 Effective immediately immediately during positioning oscillation, and the default value is 0	177_31	OVOODI	loop	15t integral of velocity loop		-
PA_40 0x0040 2nd integral of velocity loop velocity letring bandwidth velocity loop velocity letring bandwidth, unit: Hz velocity letring velocity letring bandwidth, unit: Hz velocity letring bandwidth, unit: Hz velocity letring loop velocity letring bandwidth, unit: Hz velocity letring loop velocity letring bandwidth, unit: Hz velocity letring bandwidth, unit: Hz velocity letring land velocity letring bandwidth, unit: Hz velocity letring land velocity letring land velocity letring bandwidth, unit: Hz velocity letring land velocity letring bandwidth, unit: Hz velocity letring land velocity letring bandwidth velocity letring land velocity letring land velocity letring land velocity letring letring land velocity letring land velo						
PA_41	DA 40	00040	2nd integral of	2		
PA_41 0x0041 Interference resistance gain	PA_40	0X0040		2nd integral of velocity loop		-
PA_41			7 1			
PA_42   0x0041   resistance gain   default value is 0   Effective immediately   -			Interference			
PA_42	PA_41   0x0041	0x0041				-
PA_42				default value is 0		
PA_42   0x0042   reedforward   0.1%				Acceleration feedforward coefficient unit:		
PA_43	PA_42	0x0042	feedforward		Effective	-
PA_43   0x0043   feedforward low-pass filtering bandwidth   Current loop gain   Current loop gain   Effective after release and writing   RW   PA_44   0x0044   Current loop gain   Current loop gain   Effective   - immediately   PA_45   0x0045   Current loop integral   Current loop integral   Effective   - immediately   PA_46   0x0046   Gain setting   0: Effective 1st gain;   Effective   - immediately   PA_48   0x0048   Load inertia ratio   Load inertia ratio   Effective after release and writing   PA_48   0x0048   Load inertia ratio   Load inertia ratio   Effective after release and writing   PA_49   PA_40   PA_40			coefficient	0.170	immediately	
PA_44   0x0044   Current loop gain   Current loop gain   Effective after release and writing   RW   PA_45   0x0045   Current loop integral   Current loop integral   Current loop integral   RW   PA_46   0x0046   Gain setting   0: Effective 1st gain; 0: Effective 2nd gain;   Effective after release and writing   RW   PA_48   0x0048   Load inertia ratio   Load inertia ratio   Effective after release and writing   RW   PA_4A   0x004A   Rigidity coefficient   0: 100%;   RW   PA_4B   0x004B   Filter On configuration   Bit definition, 0: Disable; 1: Enable; Bit0: Given velocity filtering; Bit2: Civen current filtering; Bit3: Current filtering; Bit4: Torque filter, second-order notch filter;   RW   PA_4C   0x004C   Given velocity filtering bandwidth   Given velocity filtering bandwidth   Given velocity filtering bandwidth   Given velocity filtering bandwidth unit: Hz   Effective after release and writing   RW   Filter On configuration   Given velocity filtering bandwidth   Given velocity filtering bandwidth unit: Hz   Effective after release and writing   RW   Filtering bandwidth   Given velocity filtering bandwidth unit: Hz   Effective after   -			Acceleration	A 1	RW	
Filtering bandwidth  PA_44	PA_43	0x0043		Acceleration feedforward low-pass	Effective after	-
PA_44				filtering, unit: Hz	release and writing	
PA_44			S			
PA_45	PA 44	0x0044	Current loop gain	Current loop gain		_
PA_45	111	0.100	Current roop gum	Current roop gum		
PA_45						
PA_46	DA 45	0×0045	Current loon integral	Current loop integral		
PA_46	FA_43	030043	Current 100p integral	Current 100p integral		-
PA_46						
PA_48	DA 46	020046	Coin sauin-	0: Effective 1st gain;		
PA_48	PA_46	UXUU46	Gain setting			-
PA_48						
PA_4A 0x004A Rigidity coefficient  PA_4B 0x004B Filter On configuration  Filter On configuration  PA_4C 0x004C Given velocity filtering bandwidth Filtering bandwidth Given velocity filtering bandwidth Given velocity filtering bandwidth, unit: Hz  Rigidity coefficient  0: 100%; RW Effective after release and writing  8 Effective after release and writing  Bit definition, 0: Disable; 1: Enable; Bit0: Given velocity filtering; Bit1: Velocity feedback filtering; Bit2: Given current filtering; Bit3: Current feedback filtering; Bit4: Torque filter, second-order notch filter;  RW Effective after release and writing  RW Effective after release and writing	D: 10	0.0010	T 1	<b>.</b>		
PA_4A 0x004A Rigidity coefficient  0: 100%; 1: 80%; 2: 75%; release and writing 3: 50%;  Bit definition, 0: Disable; 1: Enable; Bit0: Given velocity filtering; Bit1: Velocity feedback filtering; Bit2: Given current filtering; Bit3: Current feedback filtering; Bit4: Torque filter, second-order notch filter;  PA_4C 0x004C Given velocity Given velocity Given velocity filtering bandwidth Given velocity filtering bandwidth, unit: Hz  RW Effective after release and writing RW Effective after RW Effective after Filter On Configuration Given velocity Given velocity filtering bandwidth, unit: Hz Effective after Filter On Configuration Given velocity Filtering bandwidth Given velocity filtering bandwidth, unit: Hz	PA_48	0x0048	Load inertia ratio	Load inertia ratio		-
PA_4A				20.00	release and writing	
PA_4A 0x004A Rigidity coefficient  1: 80%; 2: 75%; 3: 50%;  Bit definition, 0: Disable; 1: Enable; Bit0: Given velocity filtering; Bit1: Velocity feedback filtering; Bit2: Given current filtering; Bit3: Current feedback filtering; Bit4: Torque filter, second-order notch filter;  PA_4C 0x004C Given velocity Given velocity Given velocity filtering bandwidth, unit: Hz  Given velocity filtering bandwidth Given velocity filtering bandwidth, unit: Hz  Given velocity filtering bandwidth, unit: Hz  Effective after  7  RW  Effective after 7  RW  Effective after 7  Given velocity filtering bandwidth, unit: Hz						
PA_4A 0x004A Rigidity coefficient  1: 80%; 2: 75%; 3: 50%;  Bit definition, 0: Disable; 1: Enable; Bit0: Given velocity filtering; Bit1: Velocity feedback filtering; Bit2: Given current filtering; Bit3: Current feedback filtering; Bit4: Torque filter, second-order notch filter;  PA_4C 0x004C Given velocity Filtering bandwidth  Given velocity filtering bandwidth, unit: Hz  Effective after release and writing  RW Effective after release and writing  RW Effective after release and writing  RW Effective after release and writing  Filtering bandwidth, unit: Hz  RW Effective after release and writing				0: 100%;	RW	
PA_4B	PA 4A	0x004A	Rigidity coefficient	1: 80%;		-
PA_4B			5 1,7 1 1 1 1 1 1 1 1 1			
PA_4B 0x004B Filter On configuration Filter On configuration  Filter On configuration  Filter On configuration  Filter On configuration  Filter On configuration  Bit definition, 0: Disable; 1: Enable; Bit0: Given velocity filtering; Pit1: Velocity feedback filtering; Pit2: Given current filtering; Pit3: Current feedback filtering; Pit4: Torque filter, second-order notch Filter;  PA_4C 0x004C Given velocity filtering bandwidth  Given velocity filtering bandwidth, unit: Hz Effective after Filtering bandwidth or selective filtering bandwidth or selective after Filtering bandwidth or selective filtering bandwidth or selective after Filter						
PA_4B						
PA_4B						
PA_4B 0x004B Filter On configuration Bit2: Given current filtering; Bit3: Current feedback filtering; Bit4: Torque filter, second-order notch filter;  PA_4C 0x004C Given velocity filtering bandwidth Given velocity filtering bandwidth, unit: Hz Effective after release and writing RW Given velocity filtering bandwidth, unit: Hz					DW	
PA_4B	PA_4B 0x	0.00:-				-
PA_4C 0x004C Given velocity filtering bandwidth Given velocity filtering bandwidth, unit: Hz Effective after -		0x004B				./
PA_4C 0x004C Given velocity filtering bandwidth Given velocity filtering bandwidth, unit: Hz Effective after -			configuration		release and writing	
PA_4C 0x004C Given velocity Given velocity filtering bandwidth, unit: Hz Effective after -						
PA_4C   0x004C   Given velocity   Given velocity filtering bandwidth, unit: Hz   Effective after   -				filter;		
PA_4C   0x004C   filtering bandwidth   Given velocity intering bandwidth, unit: HZ   Effective after   -			Given velocity			
release and writing	PA_4C	0x004C		Given velocity filtering bandwidth, unit: Hz		-
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	filtering bandwidth		release and writing	



	1	T		· · · · · · · · · · · · · · · · · · ·	
		Velocity feedback	Velocity feedback filtering bandwidth, unit:	RW	
PA_4D	0x004D	filtering bandwidth	Hz	Effective after	-
		intering bandwidth	112	release and writing	
		G: CIL :		RW	
PA_4E	0x004E	Given current filtering	Given current filtering bandwidth, unit: Hz	Effective after	_
	0.100.2	bandwidth	Civen current intering cume vicus, units in	release and writing	
				RW	
D4 4E	0.0045	Current feedback	Current feedback filtering bandwidth, unit:	2011	
PA_4F	0x004F	filtering bandwidth	Hz	Effective after	-
				release and writing	
		Torque notch filter		RW	
PA_50	0x0050		Torque notch filter frequency, unit: Hz	Effective after	-
		frequency		release and writing	
				RW	
PA_51	0x0051	Torque notch filter	Torque notch filter width, unit: Hz	Effective after	_
171_31	0.0031	width	Torque noten inter width, unit. 112	release and writing	
				)	
		Torque notch filter		RW	
PA_52	0x0052	depth	Torque notch filter depth, unit: dB	Effective after	-
		асриі		release and writing	
		T'll	O N/A	RW	
PA_53	0x0053	Filter parameter	0: N/A;	Effective after	_
		calculation	1: Calculate filter parameters	release and writing	
				RW	
DA 54	0x0054	Iark amouthing foot - "	0: N/A;	Effective after	
PA_54	0X0034	Jerk smoothing factor	Level 1~7 smoothing;		-
			6,	release and writing	
		Electronic gear		RW	
PA_067	0x0067		Electronic gear numerator	Effective after	-
		numerator		power-on	
				RW	
PA_068	0x0068	Electronic gear	Electronic gear denominator	Effective after	
1A_000	PA_008 0X0008	denominator	Licetronic gear denominator		_
				power-on	
			0: Default;	RW	
PA_069	0x0069	Default direction	1: Negative;	Effective after	-
			1. Hogative,	power-on	
		0 11 6		RW	
PA_06A	0x006A	Opening delay of	Opening delay of brake, unit: ms	Effective after	-
		brake	3	power-on	
				RW	
DA 06D	0x006B	Clasina dalam of busha	Clasina dalari of buolia maiti ma	Effective after	
PA_06B	OXOOOB	Closing delay of brake	Closing delay of brake, unit: ms		-
				power-on	
		Relief opening		RW	
PA_06C	0x006C		Relief opening threshold, unit: 0.001V	Effective after	-
		threshold		power-on	
				RW	
PA_06D	0x006D	Relief closing	Relief closing threshold, unit: 0.001V	Effective after	_
171_00D	UNUUUD	threshold	Tener crossing unconoid, unit. 0.001 V		-
				power-on	
D	0 00==			RW	
PA_070	0x0070	In-place error	Unit: pulse	Effective after	-
				release and writing	
				RW	
PA_071	0x0071	In-place time	Unit: ms	Effective after	-
		r	<u> </u>	release and writing	
				RW	
DA 077	0.0076	Out-of-tolerance	I Init. mulan		
PA_076	0x0076	threshold	Unit: pulse	Effective after	-
				release and writing	
		Input terminal		RW	
PA_081	0x0081		Input terminal filtering	Effective	-
_		filtering		immediately	
				RW	
PA_083	0x0083	Software limit switch	0: Noneffective;	Effective	
177_002	0.00000	Software milit switch	1: Effective after homing		-
		1		immediately	
		Velocity limit under		RW	
PA_085	0x0085		Unit: rpm	Effective after	-
	0.0000	0x0085 torque mode		release and writing	
		•			



			Code	Status		
			Bit0	DI0		
			Bit1	DI1	RW	
PA_086	0x0086	Input terminal polarity	Bit2	DI2	Effective after	-
			Bit3	DI3	release and writing	
			Bit4	DI4		
			0: Normally open;	1: Normally closed		
				•	RW	
DA 007	0x0087	DI Innut Dont O			Effective	
PA_087	UXUU87	DI Input Port 0			immediately	-
			Code	Functions	RW	
DA 000	0x0088	DI Innut Dont 1	0x00	N/A	Effective	
PA_088	000088	DI Input Port 1	0x01	Origin signal	immediately	-
			0x01 0x02	Positive limit	RW	
PA_089	0x0089	DI Input Port 2	0x02 0x03	Negative limit	Effective	
PA_089	000089	DI Input Port 2				-
			0x04	Signal release	immediately RW	
DA 00 A	0x008A	DI Inmust Domt 2	0x05	Signal stop	Effective	
PA_08A	UXUU8A	DI Input Port 3	0x06	Forced		-
				emergency stop	immediately RW	
DA OOD	0000D	DI In most De at 4				
PA_08B	0x008B	DI Input Port 4			Effective immediately	-
					immediately	
			Code	Status		
		0	Bit0	DO0	RW	
PA_08C	0x008C	Output terminal	Bit1	DO1	Effective	-
_		polarity	Bit2	DO2	immediately	
			0: Normally open;	1: Normally closed		
			J 11 7	· · · · · · · · · · · · · · · · · · ·	DW	
D4 00D	0000	DO Ontrod David	Code	Functions	RW	
PA_08D	0x008D	DO Output Port 0	0x00	N/A	Effective	-
			0x01	Alarm output	immediately	
DA 00E	0.0005	DO 0 4 4 D 4 1	0x02	Motor running	RW	
PA_08E	0x008E	DO Output Port 1	0x03	Homing	Effective	-
				completed	immediately	
			0x04	In-place signal		
			0x05	Z signal		
			0x06	Signal of internal	RW	
PA_08F	0x008F	DO Output Port 2		contracting brake	Effective	-
			0x09	User Definition 0	immediately	
			0x0A	User Definition 1		
			0x0A 0x0B	User Definition 2		
			UNUD	Coci Dellindoll 2		

## **4.2.3 Motion parameters**

No.	Register address	Meaning	Description	Property	Range
PA_201	0x0201	Control command	Control word	RW Effective immediately	-
PA_204	0x0204	Operating mode	1: Position mode; 3: Velocity mode; 4: Torque mode; 6: Homing mode;	RW Effective immediately	-
PA_20A	0x020A	Target position H under position mode	Unit: pulse	RW Effective immediately	-
PA_20B	0x020B	Target position L under position mode	Unit: pulse	RW Effective immediately	-



	1	1			
PA_20C	0x020C	Target velocity H	Unit: rpm	RW Effective	-
_		under position mode	1	immediately	
				RW	
PA_20D	0x020D	Target velocity L	Unit: rpm	Effective	_
111_202	0110202	under position mode	Cinc. Ipin	immediately	
				RW	
DA 20E	0x020E	Acceleration time H	Unit: ms	Effective	
PA_20E	UXUZUE	under position mode	Oint. his		-
		_		immediately	
DA 20E	0.0205	Acceleration time L	TT *	RW	
PA_20F	0x020F	under position mode	Unit: ms	Effective	-
		1		immediately	
		Deceleration time H		RW	
PA_210	0x0210	under position mode	Unit: ms	Effective	-
		ander position mode		immediately	
		Deceleration time L		RW	
PA_211	0x0211	under position mode	Unit: ms	Effective	-
		under position mode		immediately	
		T . 1 '4 II		RW	
PA_212	0x0212	Target velocity H	Unit: rpm	Effective	-
_		under velocity mode	1	immediately	
				RW	
PA_213	0x0213	Target velocity L	Unit: rpm	Effective	_
171_213	0.0213	under velocity mode	оти: трт	immediately	
				RW	
DA 214	0 0 2 1 4	Hamina mada	Standard 1~14, 17~30 and 33~35 modes	Effective	
PA_214	0x0214	Homing mode	Standard 1~14, 1/~30 and 55~55 modes		-
				immediately	
D. 21.5	0.0215		** *	RW	
PA_215	0x0215	Homing velocity H	Unit: rpm	Effective	-
				immediately	
				RW	
PA_216	0x0216	Homing velocity L	Unit: rpm	Effective	-
				immediately	
		Queried homing		RW	
PA_217	0x0217	velocity H	Unit: rpm	Effective	-
		velocity 11		immediately	
		0		RW	
PA_218	0x0218	Queried homing	Unit: rpm	Effective	-
_		velocity L	1	immediately	
				RW	
PA_219	0x0219	Homing acceleration /	Unit: ms	Effective	_
		deceleration H	2	immediately	
				RW	
PA_21A	0x021A	Homing acceleration /	Unit: ms	Effective	_
111_2111	0.02171	deceleration L	Cint. IIIS	immediately	_
				RW	
DA 21D	0x021B	Homing offset H	Unit: pulca	Effective	
PA_21B	UAUZIB	Homing onset H	Unit: pulse		-
				immediately	
DA CLC	0.0216	II . cc . I	TT '. 1	RW	
PA_21C	0x021C	Homing offset L	Unit: pulse	Effective	-
				immediately	
		Positive software limit		RW	
PA_21D	0x021D	H	Unit: pulse	Effective	-
		11		immediately	
	]	Positive software limit		RW	
PA_21E	0x021E		Unit: pulse	Effective	-
		L	<u> </u>	immediately	
		NT C		RW	
PA_21F	0x021F	Negative software	Unit: pulse	Effective	-
		limit H	r	immediately	
				RW	
PA_220	0x0220	Negative software	Unit: pulse	Effective	_
	5.1.5225	limit L	Citto parse	immediately	
L	1			iiiiiiicaiatei y	<u>l</u>



PA_221	0x0221	Target torque	Unit: 0.1% p.u.	RW Effective immediately	-
PA_222	0x0222	Target torque limit	Unit: 0.1% p.u.	RW Effective immediately	-
PA_223	0x0223	Feedback torque	Unit: 0.1% p.u.	RW Effective immediately	-
PA_224	0x0224	Torque gradient H	Unit: 0.1% p.u.	RW Effective immediately	-
PA_225	0x0225	Torque gradient L	Unit: 0.1% p.u.	RW Effective immediately	-
PA_226	0x0226	60FD mapping	Bit0: Negative limit;	RW Effective immediately	-
PA_227	0x0227	60FD mapping	Bit1: Positive limit; Bit2: Origin;	RW Effective immediately	-
PA_228	0x0228	60FE 01 mapping	Physical output	RW Effective immediately	-
PA_229	0x0229	60FE 01 mapping	Filysical output	RW Effective immediately	-
PA_22A	0x022A	60FE 02 mapping	Output shield	RW Effective immediately	-
PA_22B	PA_22B 0x022B	22B 60FE 02 mapping	Output shield	RW Effective immediately	-



# **Chapter V Troubleshooting**

## 4.1 Description and handling method of alarm indicator

1. Motor line power line short circuit or motor fault;   2. Incorrect phase sequence of motor power line, check the phase sequence;   3. Incorrect set motor model. Check the motor model;   4. Too heavy load, first check the no-load operation for being normal;   5. Too high set gain parameter, reduce the gain parameter.   6. Internal failure of drive, send it back to the factory for maintenance.   1. Check for too high power supply voltage, reduce the voltage or replace the power supply if necessary;   2. Internal fault of drive, sent it back to the factory for maintenance.   1. Check the power supply voltage for being low, reduce the voltage or replace the power supply;   2. Internal fault of drive, sent it back to the factory for maintenance.   1. Check the power supply voltage for being low, reduce the voltage or replace the power supply;   2. Internal fault of drive, sent it back to the factory for maintenance.   1. Check the encoder for being disconnected and the plug for loose insertion;   2. Replace the motor and check the motor encoder for maintenance.   1. Motor phase sequence error. Check the motor power line for incorrect connection;   2. Internal fault of drive, sent it back to the factory for maintenance.   1. Motor phase sequence error. Check the motor power line for incorrect connection;   2. Internal fault of drive, sent it back to the factory for maintenance.   3. Bad drive encoder, sent it back to the factory for maintenance.   4. Motor phase sequence error. Check the motor power line for incorrect connection;   3. Internal fault of drive, sent it back to the factory for maintenance.   4. Motor phase sequence error. Check the motor power line for incorrect connection;   5. The proof of alarms. If the alarms still occur, send it back to the factory for maintenance.   6. Literal fault of drive, sent it back to the factory for maintenance.   7. Check the power line for phase loss;	Number of		
2. Incorrect phase sequence of motor power line, check the phase sequence; 3. Incorrect set motor model. Check the motor model; 4. Too heavy load, first check the no-load operation for being normal; 5. Too high set gain parameter, reduce the gain parameter. 6. Internal failure of drive, send it back to the factory for maintenance. 1. Check for too high power supply voltage, reduce the voltage or replace the power supply if necessary; 2. Internal fault of drive, sent it back to the factory for maintenance. 1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance. 1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance. 1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance. 1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance. 1. Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance. 1. Check the power line for phase loss;		Description	Troubleshooting
2. Incorrect phase sequence of motor power line, check the phase sequence; 3. Incorrect set motor model. Check the motor model; 4. Too heavy load, first check the no-load operation for being normal; 5. Too high set gain parameter, reduce the gain parameter. 6. Internal failure of drive, send it back to the factory for maintenance. 1. Check for too high power supply voltage, reduce the voltage or replace the power supply if necessary; 2. Internal fault of drive, sent it back to the factory for maintenance. 1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance. 1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance. 1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance. 1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance. 1. Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance. 1. Check the power line for phase loss;			1. Motor line power line short circuit or motor fault;
3. Incorrect set motor model. Check the motor model; 4. Too heavy load, first check the no-load operation for being normal; 5. Too high set gain parameter, reduce the gain parameter. 6. Internal failure of drive, send it back to the factory for maintenance. 1. Check for too high power supply voltage, reduce the voltage or replace the power supply if necessary; 2. Internal fault of drive, sent it back to the factory for maintenance. 1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance. 1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance. 1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance. 1. Check the power line for phase loss;			
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being normal; 5. Too high set gain parameter, reduce the gain parameter. 6. Internal failure of drive, send it back to the factory for maintenance.  1. Check for too high power supply voltage, reduce the voltage or replace the power supply if necessary; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			3. Incorrect set motor model. Check the motor model;
being normal; 5. Too high set gain parameter, reduce the gain parameter. 6. Internal failure of drive, send it back to the factory for maintenance.  1. Check for too high power supply voltage, reduce the voltage or replace the power supply if necessary; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			4. Too heavy load, first check the no-load operation for
parameter. 6. Internal failure of drive, send it back to the factory for maintenance.  1. Check for too high power supply voltage, reduce the voltage or replace the power supply if necessary; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;	1	Overcurrent	being normal;
6. Internal failure of drive, send it back to the factory for maintenance.  1. Check for too high power supply voltage, reduce the voltage or replace the power supply if necessary; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			5. Too high set gain parameter, reduce the gain
Distribution of the power supply voltage, reduce the voltage or replace the power supply if necessary;  2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the power supply voltage for being low, reduce the voltage or replace the power supply;  2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the power supply voltage for being low, reduce the voltage or replace the power supply;  2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the encoder for being disconnected and the plug for loose insertion;  2. Replace the motor and check the motor encoder for malfunction;  3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection;  2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			parameter.
Overvoltage  1. Check for too high power supply voltage, reduce the voltage or replace the power supply if necessary; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			6. Internal failure of drive, send it back to the factory for
Voltage or replace the power supply if necessary; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			maintenance.
2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			1. Check for too high power supply voltage, reduce the
2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;	2	Overvoltage	voltage or replace the power supply if necessary;
1. Check the power supply voltage for being low, reduce the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;	2	Overvoltage	2. Internal fault of drive, sent it back to the factory for
the voltage or replace the power supply; 2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			maintenance.
2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			1. Check the power supply voltage for being low, reduce
2. Internal fault of drive, sent it back to the factory for maintenance.  1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;	3	Undervoltage	the voltage or replace the power supply;
1. Check the encoder for being disconnected and the plug for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			2. Internal fault of drive, sent it back to the factory for
for loose insertion; 2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			
Encoder disconnection error  2. Replace the motor and check the motor encoder for malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			
error malfunction; 3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			
3. Bad drive encoder, send it back to the factory for maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;	4		
maintenance.  1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			
1. Motor phase sequence error. Check the motor power line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			_
Phase current error  line for incorrect connection; 2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			
2. Internal fault of drive, sent it back to the factory for maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			
maintenance.  Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;	5	Phase current error	,
Initialize the parameters and restart the device to check for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			· ·
for alarms. If the alarms still occur, send it back to the factory for maintenance.  1. Check the power line for phase loss;			
factory for maintenance.  1. Check the power line for phase loss;	6	I2T error	-
1. Check the power line for phase loss;	O	121 (1101	
2. Check for too high load:			2. Check for too high load;
Position 3 Check for too high velocity, and reduce the velocity if		Position	_
7 out-of-tolerance necessary;	7		
4. Too low set position out-of-tolerance threshold,			-
increase this parameter PA_76;			_



## **Chapter V Description of MODBUS RTU Protocol**

## 5.1 Parameter reading command (0x03)

Command sent by master station (PLC, etc.):

Byte order	Command example	Functional symbols	Functions
1st Byte	0x01	Slave Addr	Slave address, here is 1
2nd Byte	0x03	CMD	Function code, here is 0x03, indicating that it is a command to read parameters
3rd Byte	0x00	Start AddrH	Upper 8 bits of the starting address of the read parameter
4th Byte	0x0A	Start AddrL	Lower 8 bits of the starting address of the read parameter
5th Byte	0x00	Num_High(Byte)	Upper 8 bits of the number of read parameters Note: The number here refers to how many registers (words), not how many bytes.
6th Byte	0x01	Num_Low(Byte)	Lower 8 bits of the number of read parameters
7th Byte	0Xa4	CRC_H	High bit of CRC check. CRC check refers to the CRC checksum of the 1st to the previous byte (here is the 6th byte).
8th Byte	0x08	CRC_L	Low bit of CRC check.

[For the above example: A parameter is read from the master station with the slave station address set as 1 and the starting address, as 10 (0x000A), namely, two bytes are read]

Slave station (drive) response:

Byte order	Command example	Functional symbols	Functions	
1st Byte	0x01	Slave Addr	Slave address, here is 1	
2nd Byte	0x03	CMD	Function code, 0x03, corresponding to the master command	
3rd Byte	0x02	Data Lenth	Data length of the response, unit: bytes	
4th Byte	0x00	Data0	Data 0 (high bit of the 1st register)	
5th Byte	0x00	Data0	Data 0 (low bit of the 1st register)	
6th Byte	0Xb8	CRC_H	High bit of CRC check. CRC check refers to the CRC checksum of the 1st to the previous byte (here is the 9th byte).	
7th Byte	0x44	CRC_L	Low bit of CRC check.	

[Responded data0: 0x0000;]

## 5.2 Single-register writing command (0x06)

Command sent by master station (PLC, etc.):

Byte order	Command example	Functional symbols	Functions
1st Byte	0x01	Slave Addr	Slave address, here is 1
2nd Byte	0x06	CMD	Function code, here is 0x06, indicating that it is to write a parameter command
3rd Byte	0x00	Start AddrH	Upper 8 bits of the starting address of the written parameter
4th Byte	0x70	Start AddrL	Lower 8 bits of the starting address of the written parameter
5th Byte	0x00	DATA(0)	Upper 8 bits of the written data.
6th Byte	0x14	DATA(1)	Lower 8 bits of the written data.
7th Byte	0x88	CRC_H	High bit of CRC check. CRC check refers to the CRC checksum of the 1st to the previous byte (here is the 6th byte).
8th Byte	0x1E	CRC_L	Low bit of CRC check.

[For the above example: A parameter is written from the master station with the slave station address set as 1 and the starting address, as 112(0x0070), the value is 20(0x0014)]



Slave station (drive) response:

Byte order	Command example	Functional symbols	Functions	
1st Byte	0x01	Slave Addr	Slave address, here is 1	
2nd Byte	0x06	CMD	Function code, 0x06, corresponding to the master command	
3rd Byte	0x00	Start AddrH	Upper 8 bits of the starting address of the written parameter	
4th Byte	0x70	Start AddrL	Lower 8 bits of the starting address of the written parameter	
5th Byte	0x00	DATA(0)	Upper 8 bits of the written data.	
6th Byte	0x14	DATA(1)	Lower 8 bits of the written data.	
7th Byte	0x88	CRC_H	High bit of CRC check. CRC check refers to the CRC checksum of the 1st to the previous byte (here is the 6th byte).	
8th Byte	0x1E	CRC_L	Low bit of CRC check.	

## 5.3 Muiti-register writing command (0x10)

Command sent by master station (PLC, etc.):

Byte order	Command example	Functional symbols	Functions	
1st Byte	0x01	Slave Addr	Slave address, here is 1	
2nd Byte	0x10	CMD	Function code, here is 0x10, indicating that it is to write multiple parameter commands	
3rd Byte	0x00	Start AddrH	Upper 8 bits of the starting address of the written parameter	
4th Byte	0xB0	Start AddrL	Lower 8 bits of the starting address of the written parameter	
5th Byte	0x00	NUM_H	Upper 8 bits of the number of parameters (registers) written	
6th Byte	0x02	NUM_L	Lower 8 bits of the number of parameters (registers) written	
7th Byte	0x04	Data Length	The number of bytes of the parameter written is twice the number of registers	
8th Byte	0x03	DATA(0)	Upper 8 bits of the first data written.	
9th Byte	0xE8	DATA(0)	Lower 8 bits of the first data written.	
10th Byte	0x00	DATA(1)	Upper 8 bits of the second data written.	
11th Byte	0x64	DATA(1)	Lower 8 bits of the second data written.	
12th Byte	0x79	CRC_H	High bit of CRC check. CRC check refers to the CRC checksum of the 1st to the previous byte (here is the 6th byte).	
13th Byte	0x40	CRC_L	Low bit of CRC check.	

[For the above example: 2 parameters are written from the master station with the slave station address set as 1 and the starting address, as 176(0x00B0), which are:

176(0x00B0)=1000(0x03E8), 177(0x00B1)=100(0x0064)]

Slave station (drive) response:

Byte order	Command example	Functional symbols	Functions	
1st Byte	0x01	Slave Addr	Slave address, here is 1	
2nd Byte	0x10	CMD	Function code, 0x10, corresponding to the master command	
3rd Byte	0x00	Start AddrH	Upper 8 bits of the starting address of the written parameter	
4th Byte	0xB0	Start AddrL	Lower 8 bits of the starting address of the written parameter	
5th Byte	0x00	NUM_H	Upper 8 bits of the number of parameters to be written (number of registers).	
6th Byte	0x02	NUM_L	Lower 8 bits of the number of parameters to be written (number of registers).	
7th Byte	0x40	CRC_H	High bit of CRC check. CRC check refers to the CRC checksum of the 1st to the previous byte (here is the 6th byte).	
8th Byte	0x2F	CRC_L	Low bit of CRC check.	



## **5.4** Abnormal response and error code

Regardless of the read or write command, if the slave responds abnormally, its response frame is changed. As follows

Byte order	Command example	Functional symbols	Functions
1st Byte	0x01	Slave Addr	Slave address, here is 1
2nd Byte	0x06	CMD 0x80	Highest Position 1 of function code
			Error code. There are the following types:
21 D4-	0x04	Error Code	0x02: Illegal address
3rd Byte			0x03: Illegal data
			0x04: Refused to execute
			High bit of CRC check. CRC check refers to the CRC
4th Byte	0x10	CRC_H	checksum of the 1st to the previous byte (here is the 3rd
			byte).
5th Byte	0x00	CRC_L	Low bit of CRC check.



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