ZLAC8030D Servo Driver

RS485 Communication Quick Start Guide

Version	Description	Date
V1.00	First Edition	2024/3/22

CATALOGUE

1. RS485 Serial Port Settings

RS485 communication of ZLAC8030D supports Modbus RTU protocol.

The driver address can be set to 0-127. The default address is 1.

For RS485 communication, ZLAC8030D has 6 optional baud rates: 9600, 19200, 38400, 57600, 115200, 128000. Baud rate could be set through software, its default value is 115200. (For PC software, baud rate 9600 is unserviceable)

2. Wiring Connection

2.1 Basic Wiring Diagram
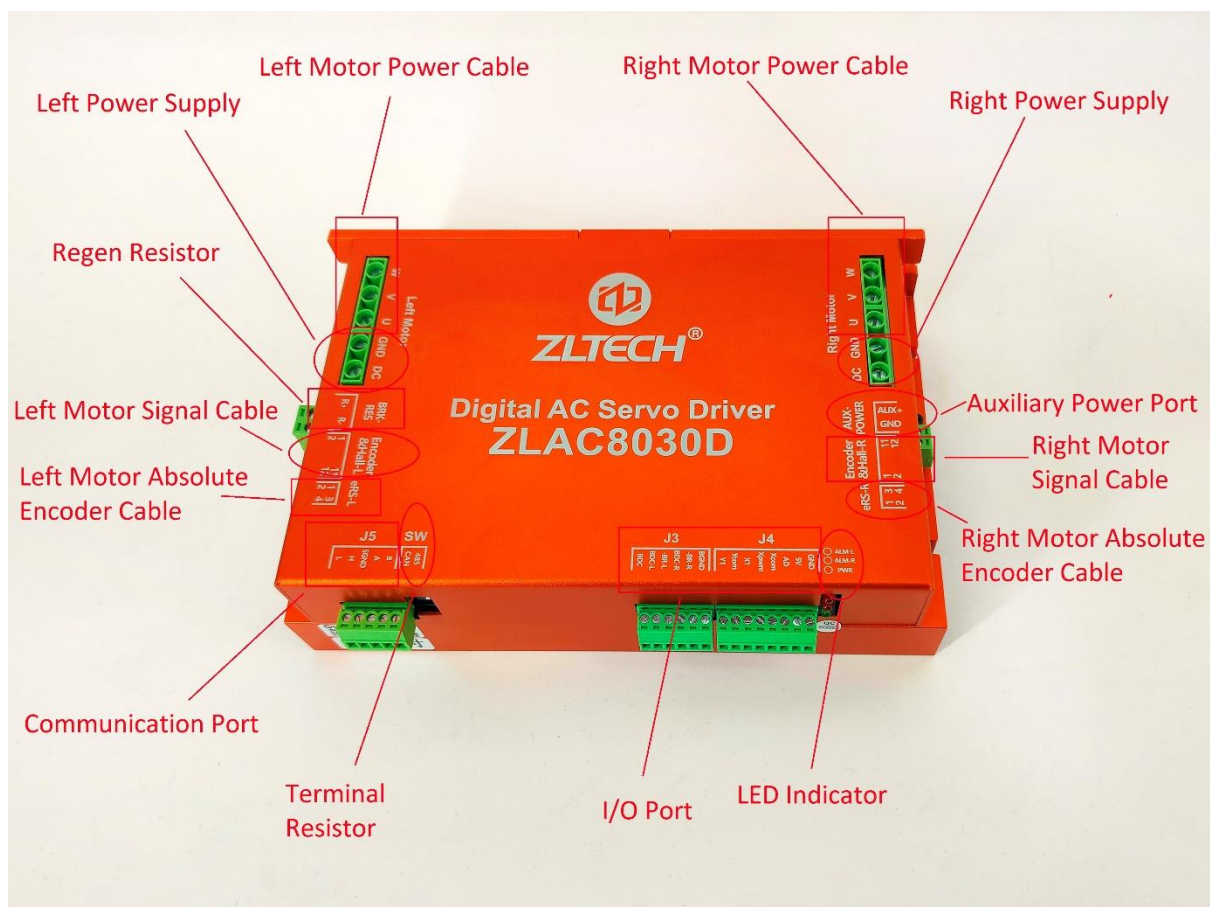
2.2 RS485 Port

Note: There is only one set of 485 interfaces. If users need to connect multiple drivers, please connect them in parallel to A (pin4), B (pin5), and SGND (pin3). This driver communication is isolated, and users need to connect the ground signal SGND.

Port	Pin	Mark	Name	Function
	1	CANH	CANOPEN	
	2	CANL		
	3	SGND	Communication GND	
	4	A	RS485	
	5	B		

3. Protocol Format

3.1 Communication Setting

Baud rate: 115200, ID: 1 (default)

3.2 RS485 Basic Format
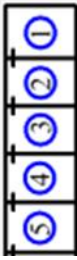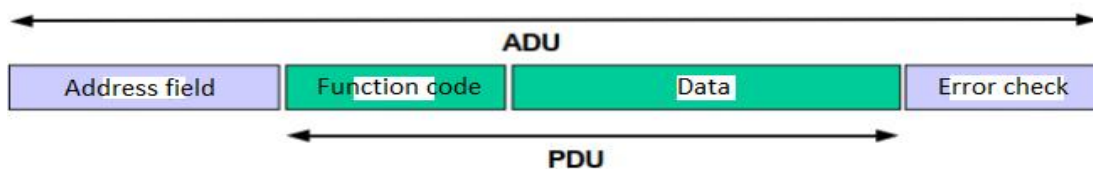

The function codes supported by ZLAC8030D are as below:

Function description	Function code	Error function code
Read multiple registers	0x03	0x83
Write single register	0x06	0x86
Writer multiple registers	0x10	0x90

3.3 Write Single Register Function Code 0x06

Send command format: Driver address + Function code + Register address + data + CRC check code.

Command	Content Description
01	Driver Address
06	Function Code
20	High 8 bits of register start address
88	Low 8 bits of register start address
00	High 8 bits of register data
64	Low 8 bits of register data
03	High 8 bits of CRC check
CB	Low 8 bits of CRC check

Return command format: Driver address + Function code + Register address + data + CRC check

code.

Command	Content Description
01	Driver Address
06	Function Code
20	High 8 bits of register start address
88	Low 8 bits of register start address
00	High 8 bits of register number
64	Low 8 bits of register number
03	High 8 bits of CRC check
CB	Low 8 bits of CRC check

3.4 Write Multiple Register Function Code 0x10

Send command format: Driver address + Function code + Register address + Register number+ Number of bytes + data + CRC check code.

Command	Content Description
01	Driver Address
10	Function Code
20	High 8 bits of register start address
30	Low 8 bits of register start address
00	High 8 bits of register number
02	Low 8 bits of register number
04	Number of bytes
04	High 8 bits of data 0
00	Low 8 bits of data 0
00	High 8 bits of data 1
00	Low 8 bits of data 1
68	High 8 bits of CRC check
4A	Low 8 bits of CRC check

Return command format: Driver address + Function code + Register Register number + CRC check code.

Command	Content Description
01	Driver Address
10	Function Code
20	High 8 bits of register start address
30	Low 8 bits of register start address
00	High 8 bits of register number
02	Low 8 bits of register number
4A	High 8 bits of CRC check
07	Low 8 bits of CRC check

3.5 Read Register Function Code 0x03

Eg: Send command "Read the actual speed of motor", return "The actual speed of motor is 10RPM"
Send:

Command	Content Description
01	Driver Address
03	Function Code
20	High 8 bits of register start address
AB	Low 8 bits of register start address
00	High 8 bits of register number
02	Low 8 bits of register number
BE	High 8 bits of CRC check
2B	Low 8 bits of CRC check

Return data:

Command	Content Description
01	Driver Address
03	Function Code
04	Number of bytes read
00	High 8 bits of data 0
64	Low 8 bits of data 0
00	High 8 bits of data 1
64	Low 8 bits of data 1
BA	High 8 bits of CRC check
07	Low 8 bits of CRC check

4. Control Mode

4.1 Profile Velocity Mode

Note: Generally, users are required to use synchronous mode (synchronous mode about asynchronous function can also be achieved). The default shipping mode is synchronous mode.

Description	Send	Return
Set Profile Velocity Mode	01 06 20 0D 00 03 53 C8	01 06 20 0D 00 03 53 C8
Motor enable	01 06 20 0E 00 08 E2 0F	01 06 20 0E 00 08 E2 0F
Set up synchronization Target speed 100 RPM	01 10 20 88 00 02 04 00 64 00 64 23 9C	01 10 20 88 00 02 CA 22
Set up synchronization Target speed 100 RPM	01 10 20 88 00 02 04 FF 9C FF 9C D2 0B	01 10 20 88 00 02 CA 22
Set the left speed to -10 RPM and the right speed to 100 RPM	01 10 20 88 00 02 04 FF F6 00 64 B2 65	01 10 20 88 00 02 CA 22
Set the left speed to 10 RPM and the right speed to -100 RPM	01 10 20 88 00 02 04 00 0A FF 9C 02 33	01 10 20 88 00 02 CA 22

4.2 Profile Position Mode (Relative Position)

Description	Send	Return
Set relative Profile Position Mode	01 06 20 0D 00 01 D2 09	01 06 20 0D 00 01 D2 09
Set left motor Maximum speed 50RPM	01 06 20 8E 00 32 63 F4	01 06 20 8E 00 32 63 F4
Set right motor Maximum speed 50RPM	01 06 20 8F 00 32 32 34	01 06 20 8F 00 32 32 34
Motor enable	01 06 20 0E 00 08 E2 0F	01 06 20 0E 00 08 E2 0F
Set up synchronization target position 20480pulses	01 10 20 8A 00 04 08 00 00 50 00 00 00 50 00 E3 2C	01 10 20 8A 00 04 EB E0
Start up	01 06 20 0E 00 10 E2 05	01 06 20 0E 00 10 E2 05
Set up synchronization target position −20480pulses	01 10 20 8A 00 04 08 FF FF B0 00 FF FF B0 00 FC A3	01 10 20 8A 00 04 EB E0
Start up	01 06 20 0E 00 10 E2 05	01 06 20 0E 00 10 E2 05
Set left position −20480pulses, right position 20480pulses	01 10 20 8A 00 04 08 FF FF B0 00 00 00 50 00 B5 47	01 10 20 8A 00 04 08 FF FF B0 00 00 00 50 00 B5 47
Start up	01 06 20 0E 00 10 E2 05	01 06 20 0E 00 10 E2 05

4.3 Profile Position Mode (Absolute Position)

Description	Send	Return
Set absolute Profile Position Mode	01 06 20 0D 00 02 92 08	01 06 20 0D 00 02 92 08
Set left motor Maximum speed 50RPM	01 06 20 8E 00 32 63 F4	01 06 20 8E 00 32 63 F4
Set right motor Maximum speed 50RPM	01 06 20 8F 00 32 32 34	01 06 20 8F 00 32 32 34
Motor enable	01 06 20 0E 00 08 E2 0F	01 06 20 0E 00 08 E2 0F
Set up synchronization target position 20480pulses	01 10 20 8A 00 04 08 00 00 50 00 00 00 50 00 E3 2C	01 10 20 8A 00 04 EB E0
Start up	01 06 20 0E 00 10 E2 05	01 06 20 0E 00 10 E2 05
Set up synchronization target position −20480pulses	01 10 20 8A 00 04 08 FF FF B0 00 FF FF B0 00 FC A3	01 10 20 8A 00 04 EB E0
Start up	01 06 20 0E 00 10 E2 05	01 06 20 0E 00 10 E2 05
Set left position −20480pulses, right position 20480pulses	01 10 20 8A 00 04 08 FF FF B0 00 00 00 50 00 B5 47	01 10 20 8A 00 04 08 FF FF B0 00 00 00 50 00 B5 47
Start up	01 06 20 0E 00 10 E2 05	01 06 20 0E 00 10 E2 05

※ Note: In position mode, the switching of the control word will simultaneously control 2 motors. When controlling a single motor, the target position of the other motor should be given 0.

4.4 Profile Torque Mode

Description	Send	Return
Set Profile Torque Mode	01 06 20 0D 00 04 12 0A	01 06 20 0D 00 04 12 0A
Motor enable	01 06 20 0E 00 08 E2 0F	01 06 20 0E 00 08 E2 0F
Set up synchronization Target torque 2000mA	01 10 20 90 00 02 04 07 D0 07 D0 60 23	01 10 20 90 00 02 4A 25
Set up synchronization	01 10 20 90 00 02 04 F8 30	01 10 20 90 00 02 4A 25

Target torque -2000mA	F8 30 11 B9	
Set left torque 2000mA and right torque -2000mA	01 10 20 90 00 02 04 07 D0 F8 30 20 5B	01 10 20 90 00 02 4A 25
Set left torque -2000mA and right torque 2000mA	01 10 20 90 00 02 04 F8 30 07 D0 51 C1	01 10 20 90 00 02 4A 25

4.5 General Command

Master station (COB-ID:0x601)	Description
01 06 20 0E 00 07 A2 0B	Stop
01 06 20 0E 00 06 63 CB	Clear fault
01 03 20 A7 00 02 7E 28	Read left motor encoder value
01 03 20 A9 00 02 1F EB	Read right motor encoder value
01 03 20 AB 00 02 BE 2B	Read left and right motor actual speed (unit: 0.1RPM)
01 03 20 AD 00 02 5E 2A	Read left and right motor actual current (unit: 0.1A)
01 03 20 A5 00 02 DF E8	Read fault code High 16 bits: (left) Low 16 bits: (right)
01 03 20 A0 00 01 8F E8	Read software version
01 03 20 A4 00 01 CE 29	Read left and right motor temperature (unit: 1℃) High 8 bits: (left) Low 8 bits: (right)

4.6 Emergency Stop Command

Send	Receive	Description
01 06 20 0E 00 05 23 CA	01 06 20 0E 00 05 23 CA	Mtor stops and keep enabled status
01 06 20 0E 00 08 E2 0F	01 06 20 0E 00 08 E2 0F	Motor Enable (Release Emergency Stop)

※ Note: After sending emergency stop command, user needs to send enable command to release the emergency stop status.

5. Function Setting

5.1 Alarm PWM Processing Method

Open Command: 01 06 20 1F 00 01 72 0C
Close Command: 01 06 20 1F 00 00 B3 CC
Save To EEPROM: 01 06 20 10 00 01 42 0F
Trigger Mechanism: When enabling this function, driver will enter an alarm and short-circuit the motor's power UVW (after the motor power cable UVW short-circuit, it will generate resistance during motor's rotation)
Function: To prevent the robot from sliding instantly after motor alarms

5.2 Parking Mode

Open Command: 01 06 20 0C 00 01 83 C9
Close Command: 01 06 20 0C 00 00 42 09
Trigger Mechanism: When enabling this function, the motor output current will not exceed 3A
Function: When the robot is charging or standby, enter this function to prevent the motor from over temperature problem

5.3 Speed Resolution

Setting Instruction: 01 06 20 22 00 0A A2 07 (setting range: 0-10) 10 is hexadecimal A
Save To EEPROM: 01 06 20 10 00 01 42 0F
Rule: Set to A, output speed unit: 1/10=0.1 RPM. Eg: target speed is 100 RPM, and the actual output is 10 RPM

   Set to 5, output speed units: 1/5=0.2 RPM. Eg: target speed is 100 RPM, and the actual output is 20 RPM

   Set to 1, output speed unit: 1/1=1 RPM. Eg: target speed is 100 RPM, and the actual output is 100 RPM
Trigger Mechanism: After enabling the testing function, it must be saved and restarted to be effective
Function: User could use more precise target speed control

5.4 I/O Emergency Stop Processing Method

5.4.1 Wiring Diagram J4
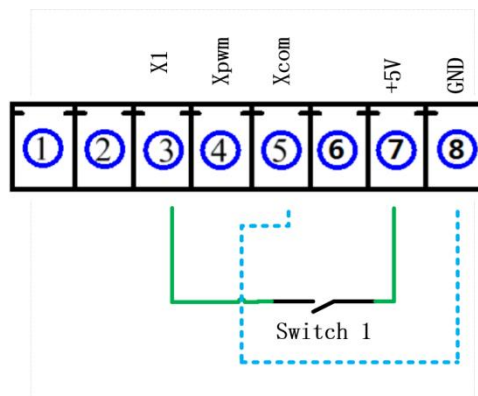
5.4.2 RS485 Command Setting

Enable input interface X1 emergency stop function: 01 06 20 17 00 09 F2 08

Enable input interface Xpwm emergency stop function: 01 06 20 18 00 09 C2 0B (at present it's only emergency stop function, if PWM function is requested, please contact technical support team)

Command to enable IO emergency stop axis release function: 01 06 20 21 00 01 13 C0

Command to turn off IO emergency stop axis release function: 01 06 20 21 00 00 D2 00

Save To EEPROM: 01 06 20 10 00 01 42 0F

Trigger mechanism: After activating this function, and triggering an external emergency stop, the motor will be in an enabled state (0 speed)

Function: When the robot is in an abnormal state, it can be pushed forward.

5.5 Brake Function

5.5.1 Wiring Diagram

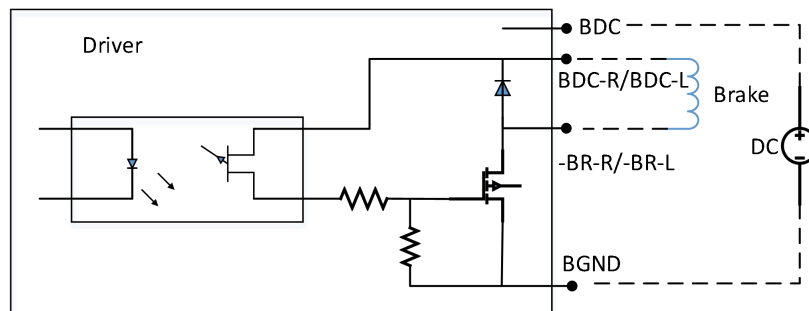Note: 20V-24V DC, brake doesn't have positive or negative poles, and could be wired freely.

5.5.2 Brake Command Setting
Release left and right brake command: 01 06 20 1A 00 00 A3 CD
                                       01 06 20 1B 00 00 F2 0D
Close left and right brake command: 01 06 20 1A 00 01 62 0D
                                       01 06 20 1B 00 01 33 CD

Function: If user's motor is equipped with an external electromagnetic brake, this command can be used to release and close the brake.

5.6 Regen Function (User just needs to connect regen resistor)

Open regen function command: 01 06 20 27 00 01 F3 C1 (Default enabled)
Close regen function command: 01 06 20 27 00 00 32 01

Other parameters can also be set through objects 0x2023~0x2026.

Function: To prevent user from damaging the drive or other equipments due to the back electromotive force generated by excessive speed and emergency stop.

6. RS485 Status Word

Index	Bit definition	Status word	Status Description
20A2h	R-bit7, bit6 L-bit15, bit14	00 00	Release shaft
		40 40	Lock shaft
		80 80	Emergency stop
		C0 C0	Alarm

	R-bit0	0	Stop
	L-bit8	1	Running

7. Fault Code

Index	Fault code	Description	Troubleshooting
20A5h	0000h	No error	Driver is normal.
	0001h	Over-voltage	1. Power supply voltage is too high 2. Excessive back electromotive force (it is recommended to add a bleeder circuit)
	0002h	Under-voltage	1. Power supply voltage is too low 2. Check if the wiring connector is correct 3. Check if the motor parameters are correct
	0004h	Left motor over-current	1. Instantaneous current is too high 2. Motor power cable is loose
	0008h	Left motor overload	1. Check if the motor cable is loose 2. Check if the wiring and motor parameters are correct 3. Motor is stall 4. Motor or driver's problem
	0020h	Left motor encoder value is out of tolerance	1. Motor is stall 2. Encoder's problem
	0080h	Left motor reference voltage error	Reference voltage circuit issue
	0100h	Left motor EEPROM read and write error	1. Firmware is upgraded (needs to make factory settings) 2. EEPROM circuit is damaged
	0200h	Left motor hall error	1. Check if the motor cable is loose 2. Motor's problem 3. Driver's problem
	0400h	Left motor temperature is too high	1. The motor current is too high (it is recommended to monitor motor's actual current and temperature, and reduce the current in real-time control) 2. Motor's thermistor is damaged 3. Driver's circuit is damaged
	0800h	Left motor encoder error	1. Check if the motor encoder cable is loose 2. Check if the motor encoder cable is disconnected
	1000h	Left driver temperature is too high	1. The driver current is too high (it is recommended to monitor the temperature of the driver in real time and control the current in real time to reduce it) 2. Driver thermistor is damaged

			3. Driver thermistor circuit is damaged
	2000h	Left motor given speed error	Given speed exceeds rated speed set
20A6h	0000h	No error	Driver is normal.
	0001h	Over-voltage	1. Power supply voltage is too high 2. Excessive back electromotive force (it is recommended to add a bleeder circuit)
	0002h	Under-voltage	1. Power supply voltage is too low 2. Check if the wiring connector is correct 3. Check if the motor parameters are correct
	0004h	Right motor over-current	1. Instantaneous current is too high 2. Motor power cable is loose
	0008h	Right motor overload	1. Check if the motor cable is loose 2. Check if the wiring and motor parameters are correct 3. Motor is stall 4. Motor or driver's problem
	0020h	Right motor encoder value is out of tolerance	1. Motor is stall 2. Encoder's problem
	0080h	Right motor reference voltage error	Reference voltage circuit issue
	0100h	Right motor EEPROM read and write error	1. Firmware is upgraded (needs to make factory settings) 2. EEPROM circuit is damaged
	0200h	Right motor hall error	1. Check if the motor cable is loose 2. Motor's problem 3. Driver's problem
	0400h	Right motor temperature is too high.	1. The motor current is too high (it is recommended to monitor motor's actual current and temperature, and reduce the current in real-time control) 2. Motor's thermistor is damaged 3. Driver's circuit is damaged
	0800h	Right motor encoder error	1. Check if the motor encoder cable is loose 2. Check if the motor encoder cable is disconnected
	1000h	Right driver temperature is too high	1. The driver current is too high (it is recommended to monitor the temperature of the driver in real time and control the current in real time to reduce it) 2. Driver thermistor is damaged 3. Driver thermistor circuit is damaged
	2000h	Right motor given speed error	Given speed exceeds rated speed set

8. Address Directionary

Index	Name	Description	Type	Access	Default
Common constant for Left and Right motors					
2000h	Communication offline time	Driver and host communication offline time setting. Unit: ms Range: 0-32767;	U16	RW/S	0
2001h	RS485 Node ID	Range: 1~127	U16	RW/S	1
2002h	RS485 Baud Rate	1: 128000bps 2: 115200bps 3: 57600bps 4: 38400bps 5: 19200bps 6: 9600bps	U16	RW/S	2
2003h	Input signal status	2 input signal level status Bit0-Bit1: X0-X1 input level status	U16	RO	0
2004h	Out signal status	2 output signal level status Bit0: Y1 output status; Bit1-Bit2: B0-B1 output status;	U16	RO	0
2005h	Clear feedback position	Used to clear feedback position in Profile Position Mode. 0: Invalid; 1: Clear the feedback position(Left); 2: Clear the feedback position(Right); 3: Clear the feedback position(Left and right); Not saved.	U16	RW	0
2006h	In absolute position control, reset the zero point	reset the zero point. 0: Invalid; 1: Reset the zero point(Left); 2: Reset the zero point(Right); 3: Reset the zero point(Right); Not saved.	U16	RW	0
2007h	Shaft state after power on	0: Not enabled, not lock shaft; 1: Not enabled, lock shaft;	U16	RW/S	0
2008h	Maximum motor speed	Motor maximum speed Unit: r/min. Range: 1-1000 r/min.	U16	RW/S	300
2009h	Register parameter settings	0: Invalid; 1: Restore factory settings.	U16	RW	0

200Ah	CAN Node ID	Range: 1-127	U16	RW/S	1
200Bh	CAN Baud rate	0: 1000 Kbit/s 1: 500 Kbit/s 2: 250 Kbit/s 3: 125 Kbit/s 4: 100 Kbit/s	U16	RW	1
200Ch	Parking mode	0: Close 1: Open	U16	RW/S	0
200Dh	Control mode	0: Undefined 1: Position mode(Relative) 2: Position mode(Absolute) 3: Velocity mode 4: Torque mode	U16	RW	0
200Eh	Control word	Control word 0: Undefined 0x05: Emergency stop 0x06: Clear error 0x07: Stop 0x08: Enable 0x10:Start(Synchronous)(needed in position mode) 0x11: Start(Left) (needed in position mode) 0x12: Start(Right) (needed in position mode)	U16	RW	0
200Fh	Synchronous/asynchronous control status	0: Synchronous 1: Asynchronous	U16	RW	0
2010h	Whether store RW register to EEPROM	Whether the value of the communication write function code is updated to the EEPROM. 0: Invalid 1: Store parameters have RW attribution to EEPROM	U16	RW	0
2011h	Quick stop control	How driver process when receive quick stop command 5: Stop 6: Quick stop(with deceleration time) 7: Quick stop(without deceleration time)	U16	RW	5
2012h	Close operation control	How driver process when receive stop command 0: Invalid; 1: Stop normally, switch to	U16	RW	1

		"ready to switch on" state			
2013h	Disable control	How driver process when receive disable command 0: Invalid 1: Stop(Switch to switch on status)	U16	RW	1
2014h	Halt control	How driver process when receive Halt command 1: Stop(operation enabled) 2: Quick stop with deceleration time (operation enable) 3: Quick stop without deceleration time(operation enable)	U16	RW	1
2016h	Input effective level	Bit0: Input terminal X0 control bit; Bit1: Input terminal X1 control bit; Bit2: AD Input control bit; Bit3-Bit5: reserved; 0: Default 1: Reverse The driver defaults to the input terminal level rising edge or high level active.	U16	RW/S	0
2017h	Input terminal X0 terminal function selection	0: None 1-8: NC 9: Emergency stop	U16	RW/S	9
2018h	Input terminal X1 terminal function selection	0: None 9: Emergency stop(PWM function is reserved)	U16	RW/S	0
2019h	Output effective level	Bit0: Output terminal Y1 control bit; Bit1: Output terminal B0 control bit; Bit2: Output terminal B1 control bit; 0: Default 1: Reverse The driver defaults to the input terminal level rising edge or high level active;	U16	RW/S	0
201Ah	Output terminal B0 terminal function	Brake state 0: Open brake	U16	RW/S	0

		selection	1: Close brake			
201Bh	Output terminal B1 terminal function selection	Brake state 0: Open brake 1: Close brake	U16	RW/S	0
201Ch	Output terminal Y1 terminal function selection	0: undefined; 1: Alarm signal; 2: Drive status signal; 3: Target position reached signal (reserved);	U16	RW/S	0
201Dh	NC	NC	U16	RW/S	0
201Eh	Driver temperature protection threshold	Unit 0.1° C; Range: 0-1200	U16	RW/S	800
201Fh	Alarm PWM processing method	0: close; 1: open	U16	RW/S	0
2020h	Overload processing method	0: close; 1: open	U16	RW/S	0
2021h	I/O emergency stop processing mode	0: Lock shaft 1: Release shaft	U16	RW/S	0
2022h	Given speed resolution	Set value range: 1-A 1: Speed resolution 1RPM 2: Speed resolution 0.5RPM 3: Speed resolution 1/3 RPM 4: Speed resolution 0.25RPM 5: Speed resolution 0.2RPM 6: Speed resolution 1/6RPM 7: Speed resolution 1/7RPM 8: Speed resolution 0.125RPM 9: Speed resolution 1/9RPM A:Speed resolution 0.1RPM	U16	RW/S	1
2023h	Regen resistance value	Unit 0.1Ω; Range 0-1000（*0.1）	U16	RW/S	50
2024h	Regen resistance power	Unit W; Range 0-1000	U16	RW/S	100
2025h	Regen opening voltage	Unit 0.1V; Range 240-750（*0.1）	U16	RW/S	700
2026h	Regen close voltage	Unit 0.1V; Range 210-720（*0.1）	U16	RW/S	620
2027h	Regen function control	Brake open/close 0: close 1: open	U16	RW/S	1
2028h	Speed exceeds the tolerance	0: close 1: open	U16	RW/S	1
2029h	Default direction	0: CW 1: CCW	U16	RW/S	0

Left motor parameter					
2030h	Encoder line	Range: 0-4096	U16	RW/S	4096
2031h	Hall offset angle	Unit: 1° Range: -360-+360	I16	RW/S	0
2032h	Overload factor	Unit: % Range: 0-300	U16	RW/S	200
2033h	Rated current	Rated current output by the driver Unit: 0.1A Range: 0-300	U16	RW/S	200
2034h	Max current	Rated current output by the driver Unit: 0.1A Range: 0-600	U16	RW/S	600
2035h	Overload protection time	Driver overload protection time Unit: 10ms Range: 0-6553	U16	RW/S	300
2036h	Position following error threshold	Encoder tolerance threshold Unit: 10counts Range: 1-6553	U16	RW/S	1638
2037h	Velocity smoothing factor	Range: 0-30000	U16	RW/S	50
2038h	Cl Kp	Range: 0-30000	U16	RW/S	30000
2039h	Cl Ki	Range: 0-30000	U16	RW/S	600
203Ah	Feedforward output smoothing factor	Range: 0-30000	U16	RW/S	100
203Bh	Torque output smoothing factor	Range: 0-30000	U16	RW/S	100
203Ch	Velocity Loop Kp	Range: 0-30000	U16	RW/S	80
203Dh	Velocity Loop Ki	Range: 0-30000	U16	RW/S	3000
203Eh	Velocity Loop Kf	Range: 0-30000	U16	RW/S	1000
203Fh	Position Loop Kp	Range: 0-30000	U16	RW/S	200
2040h	Position Loop Kf	Range: 0-30000	U16	RW/S	200
2043h	Initial velocity(Velocity mode)	Initial velocity in velocity mode Unit: r/min; Range: 1-250/min;	U16	RW/S	1r/min
2044h	Initial velocity(Position mode)	Initial velocity in position mode Range: 1-250/min;	U16	RW	1r/min
2045h	Motor poles	Range: 4-64	U16	RW	20
2046h	Over temperature threshold	Unit: 0.1°C; Range: 0-1200	U16	RW	800

2047h	Velocity observer coefficient 1	0-30000	U16	RW	1000
2048h	Velocity observer coefficient 2	0-30000	U16	RW	750
2049h	Velocity observer coefficient 3	0-30000	U16	RW	350
204Ah	Velocity observer coefficient 4	0-30000	U16	RW	1000
Right motor parameter					
2060h	Encoder line	Range: 0-4096	U16	RW/S	4096
2061h	Hall offset angle	Unit: 1° Range: -360-+360	I16	RW/S	0
2062h	Overload factor	Unit: % Range: 0-300	U16	RW/S	200
2063h	Rated current	Rated current output by the driver Unit: 0.1A Range: 0-300	U16	RW/S	200
2064h	Maximum current	Rated current output by the driver Unit: 0.1A Range: 0-600	U16	RW/S	600
2065h	Overload protection time	Driver overload protection time Unit: 10ms Range: 0-6553	U16	RW/S	300
2066h	Position following error threshold	Encoder tolerance threshold Unit: 10counts Range: 1-6553	U16	RW/S	1638
2067h	Velocity smoothing factor	Range: 0-30000	U16	RW/S	50
2068h	Current Loop Kp	Range: 0-30000	U16	RW/S	3000
2069h	Current Loop Ki	Range: 0-30000	U16	RW/S	600
206Ah	Feedforward output smoothing factor	Range: 0-30000	U16	RW/S	100
206Bh	Torque output smoothing factor	Range: 0-30000	U16	RW/S	100
206Ch	Velocity Loop Kp	Range: 0-30000	U16	RW/S	80
206Dh	Velocity Loop Ki	Range: 0-30000	U16	RW/S	3000
206Eh	Velocity Loop Kf	Range: 0-30000	U16	RW/S	1000
206Fh	Position Loop Kp	Range: 0-30000	U16	RW/S	200
2070h	Position Loop Kf	Range: 0-30000	U16	RW/S	200
2073h	Initial velocity(Velocity	Initial velocity in velocity mode	U16	RW/S	1r/min

	mode)	Unit: r/min; Range: 1-250/min;			
2074h	Initial velocity(Position mode)	Initial velocity in position mode Range: 1-250/min;	U16	RW	1r/min
2075h	Poles of motor	Range: 4-64	U16	RW/S	20
2076h	Over temperature threshold	Unit: 0.1° C; Range: 0-1200	U16	RW/S	800
2077h	Velocity observer coefficient 1	0-30000	U16	RW	1000
2078h	Velocity observer coefficient 2	0-30000	U16	RW	750
2079h	Velocity observer coefficient 3	0-30000	U16	RW	350
207Ah	Velocity observer coefficient 4	0-30000	U16	RW	1000
Control parameter					
2080h	S-shape acceleration time(Left)	Acceleration time Range: 0-32767ms	U16	RW	10ms
2081h	S-shape acceleration time(Right)	Acceleration time Range: 0-32767ms	U16	RW	10ms
2082h	S-shape deceleration time(Left)	Deceleration time Range: 0-32767ms	U16	RW	10ms
2083h	S-shape deceleration time(Right)	Deceleration time Range: 0-32767ms	U16	RW	10ms
2084h	Deceleration time of quick stop(Left)	Deceleration time Range: 0-32767ms	U16	RW	10ms
2085h	Deceleration time of quick stop(Right)	Deceleration time Range: 0-32767ms	U16	RW	10ms
2086h	Torque slope(Left)	Current/1000/second Unit: mA/S	U16	RW	300ms
2087h	Torque slope(Right)	Current/1000/second Unit: mA/S	U16	RW	300ms
2088h	Target velocity(Left)	Target velocity in velocity mode Range: -3000~3000r/min	I16	RW	0
2089h	Target velocity(Right)	Target velocity in velocity mode Range: -3000~3000r/min	I16	RW	0
208Ah	Target position high 16 bits(Left)	Range of total pulse number in position mode operation;	I16	RW	0
208Bh	Target position low 16 bits(Left)	Relative: -0x7FFFFFFF~0x7FFFFFFF Absolute:	I16	RW	0

		−0x3FFFFFFF~0x3FFFFFFF			
208Ch	Target position high 16 bits(Right)	Range of total pulse number in position mode operation;	I16	RW	0
208Dh	Target position low 16 bits(Right)	Relative: −0x7FFFFFFF~0x7FFFFFFF Absolute: −0x3FFFFFFF~0x3FFFFFFF	I16	RW	0
208Eh	Max speed(Left)	Max speed in position mode Range: 1-1000r/min;	U16	RW	120r/min
208Fh	Max speed(Right)	Max speed in position mode Range: 1-1000r/min;	U16	RW	120r/min
2090h	Target torque(Left)	Unit: mA Range: −30000~30000;	I16	RW	0
2091h	Target torque(Right)	Unit: mA Range: −30000~30000;	I16	RW	0
Read only parameter					
20A0h	Sofeware version	Default	U16	RO	−
20A1h	Bus voltage	Unit: 0.01V	U16	RO	0
20A2h	Status word	Driver controls motor movement: L-bit7,bit6 R-bit15,bit14 00 00: Shaft release 00 40: Shaft lock 00 80: Emergency stop 00 C0: Alarm Motor running status: bit0 L-bit0,R-bit8 0: Stop 1: Run	U16	RO	0
20A3h	Hall input state	Range: 0-7 If 0 or 7 occurs, hall error High 8 bits(Left) Low 8 bits(Right)	U16	RO	0
20A4h	Motor temperature	Unit: 1° C; Range: −55~120 High 8 bits(Left) Low 8 bits(Right)	U16	RO	−
20A5h	Error code(Left)	Driver error conditions defined by manufacturer. 0000h: No error 0001h : Over voltage 0002h : Under voltage 0004h: Over current 0008h: Over load 0010h: Current out of	U16	RO	0

		tolerance(reserved) 0020h: Encoder out of tolerance 0040h: Velocity out of tolerance(reserved) 0080h: Reference voltage error 0100h: EEPROM error 0200h: Hall error 0400h: Motor temperature over temperature 0800h: Encoder error 1000h: high driver temperature. 2000h: Speed setting error (the given speed cannot exceed the rated speed)			
20A6h	Error code(Right)	Driver error conditions defined by manufacturer. 0000h: No error 0001h : Over voltage 0002h : Under voltage 0004h: Over current 0008h: Over load 0010h: Current out of tolerance(reserved) 0020h: Encoder out of tolerance 0040h: Velocity out of tolerance(reserved) 0080h : Reference voltage error 0100h: EEPROM error 0200h: Hall error 0400h: Motor temperature over temperature 0800h: Encoder error 1000h: high driver temperature. 2000h: Speed setting error (the given speed cannot exceed the rated speed)	U16	RO	0
20A7h	Actual motor position high 16 bits(Left)	Actual motor position, unit: counts Range:-0x7FFFFFFF~0x7FFFFFFF	I16	RO	0
20A8h	Actual motor position low 16 bits(Left)		I16	RO	0
20A9h	Actual motor position high 16	Actual motor position, unit: counts	I16	RO	0

		Range:-0x7FFFFFFF~0x7FFFFFFF			
	bits(Right)				
20AAh	Actual motor position low 16 bits(Right)		I16	RO	0
20ABh	Actual velocity(Left)	Actual velocity,unit: 0.1r/min	I16	RO	0
20ACh	Actual velocity(Right)	Actual velocity,unit: 0.1r/min	I16	RO	0
20ADh	Actual torque(Left)	Unit: 0.1A Range: -300~300;	I16	RO	0
20AEh	Actual torque(Right)	Unit: 0.1A Range: -300~300;	I16	RO	0
20AFh	Software connected status	01			
20B0h	Driver temperature	Unit: 0.1°C; Range: -550~1200.	I16	RO	-

Note:
U16 means unsigned 16 bits; I16 means signed 16 bits; U32 means unsigned 32 bits; I32 means signed 32 bits.