



Unit-Roller485

I2C Control Protocol



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1、 Communication Protocol Structure

1.1 Communication Protocol Parameters

The I2C communication interface is used.
Recommended communication speed:200-400KHz.

2、 Configuration Registers

2.1 Mode Switch(00H)

- Function:Motor enable switch
- Register Address:00H

Address	R/W	Length	Parameter
00	R/W	1 byte	Status

- Input Parameters:
Status (1byte):

Parameter	Function	description
0x00	Motor Disable	Motor off
0x01	Motor Enable	Motor on

2.2 Mode Setting(01H)

- Function:Set motor operating mode.
- Register Address:00H

Address	R/W	Length	Parameter
01	R/W	1 byte	Mode

- Input Parameter:
Mode (1byte):

Parameter	Function	Description
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0x01	Speed Mode	Speed control loop: controls the motor to run at the target speed.
0x02	Position Mode	Position control loop: controls the motor to rotate to the specified position.
0x03	Current Mode	Current control loop: controls the motor to operate at the target working current.
0x04	Encoder Mode	Encoder mode: device acts as an input device to collect current encoder values.

2.3 Motor Over Range Protection(0AH)

- Function: Set motor rotation range protection. When enabled, if the encoder value is <-2100000000 or >2100000000, the motor stops and enters protection state.
- Register Address: 0AH

Address	R/W	Length	Parameter
0A	W	1 byte	Protection

- Input Parameters:
Protection (1byte):
0 : Disable rotation range protection
1 : Enable rotation range protection

2.4 Remove Protection(0BH)

- Function: Remove Jam protection. When the jam protection is triggered, send this command to unlock.
- Register Address: 0BH

Address	R/W	Length	Parameter
0B	W	1 byte	Status

- Input Parameters:
Status (1 byte):
1: Remove Jam Protection

2.5 Motor Status(0CH)

- Function: Motor working status.
- Register Address: 0CH

Address	R/W	Length	Parameter
0C	R	1 byte	Status

- Input Parameter:
Status (1byte):
1: Standby
1: Running
2: Error

2.6 Motor Error(0DH)

- Function: Motor error status codes.
- Register Address: 0DH

Address	R/W	Length	Parameter
0D	R	1 byte	Status

- Input Parameter:
Status (1byte):
1: Overvoltage
1: Jam
4: Over Range

2.7 Button Switch Mode(0EH)

- Function: Enable button mode switching.
- Register Address: 0EH

Address	R/W	Length	Parameter
0E	R/W	1 byte	Status

- Input Parameter:

Status (1byte):

0: Disable button mode switching

1: Enable button mode switching (long press for 5 seconds to switch motor working mode)

2.8 Motor Jam Protection(0FH)

- Function: Enable or disable motor jam protection. When jam protection is triggered, the motor locks and stops rotating. Send the Remove Protection command to unlock.

- Register Address: 0FH

Address	R/W	Length	Parameter
0F	R/W	1 byte	Status

- Input Parameters:

Status (1byte):

0: Disable jam protection

1: Enable jam protection

2.9 Device ID(10H)

- Function: Set device ID.

- Register Address: 10H

Address	R/W	Length	Parameter
10	R/W	1 byte	ID

- Input Parameters:

ID (1byte):

0-255: New device ID

2.10 RS485 Baud Rate(11H)

- Function: Set RS485 communication baud rate.

- Register Address: 11H

Address	R/W	Length	Parameter
11	R/W	1 byte	Baud

- Input Parameters:

Baud(1byte):

0: 115200bps

1: 19200bps

2: 9600bps

2.11 RGB LED Brightness(12H)

- Function: Control the brightness of the RGB LED.
- Register Address: 12H

Address	R/W	Length	Parameter
12	R/W	1 byte	Brightness

- Input Parameters:

Brightness (1byte):

0-100

2.12 RGB LED Color(30H)

- Function: Control the color of the RGB LED.
- Register Address: 30H

Address	R/W	Length	Parameter
30	R/W	3 bytes	Color

- Input Parameters:

Color(3byte):

Byte0: RGB-B value

Byte1: RGB-G value

Byte2: RGB-R value

2.13 RGB LED Mode(33H)

- Function: Control the RGB LED operating mode.
- Register Address: 33H

Address	R/W	Length	Parameter
33	R/W	1 byte	Mode

- Input Parameters:

Mode(1byte):

0: Default system state display

1: User-defined control

3、 Speed Loop Control Registers

3.1 Speed Setting(40H)

- Function: Configure the target speed(RPM)
- Register Address: 40H

Address	R/W	Length	Parameter
40	R/W	4 bytes	Speed

- Parameters:

Speed (4byte):

$$\text{Speed Setting} = \text{Speed Setting-byte0} + \text{Speed Setting-byte1} * 256 + \text{Speed Settingbyte2} * 65536 + \text{Speed Setting-byte3} * 16777216$$
$$\text{Actual Speed Setting} = \text{Speed Setting}/100$$

Range: -2100000000-2100000000

3.2 Speed Max Current Setting(50H)

- Function: Configure the maximum current limit for the target speed.
- Register Address: 50H

Address	R/W	Length	Parameter
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50	R/W	4 bytes	Max Current
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- Parameters:

Max Current (4byte):

$$\text{Max Current} = \text{Max Current-byte0} + \text{Max Current-byte1} * 256 + \text{Max Current-byte2} * 65536 + \text{Max Current-byte3} * 16777216$$

$$\text{Actual Max Current} = \text{Max Current}/100$$

Range: -120000-120000

3.4 Speed Readback(60H)

- Function: Read the current motor speed value(RPM)
- Register Address: 60H

Address	R/W	Length	Parameter
60	R	4 bytes	Speed Readback

- Parameters:

Speed Readback (4byte):

$$\text{Speed Readback} = \text{Speed Readback-byte0} + \text{Speed Readback-byte1} * 256 + \text{Speed Readback-byte2} * 65536 + \text{Speed Readback-byte3} * 16777216$$

$$\text{Actual Speed Readback} = \text{Speed Readback}/100$$

3.3 Speed PID Configuration(70H)

- Function: Configure PID parameters for the speed control loop.
- Register Address: 70H

Address	R/W	Length	Parameter
70	R/W	4 bytes	P
74	R/W	4 bytes	I
78	R/W	4 bytes	D

- Parameters:

P/I/D (4byte):

$$\text{setting value} = \text{PID-byte0} + \text{PID-byte1} * 256 + \text{PID-byte2} * 65536 + \text{PID-byte3} * 16777216$$

For example: P=1, P setting value=1*100000=100000

4、 Position Loop Control Registers

4.1 Position Control(80H)

- Function: Configure the target position.
- Register Address: 80H

Address	R/W	Length	Parameter
80	R/W	4 bytes	Position

- Parameters:

Position (4byte):

$$\text{Position Setting} = \text{Position Setting-byte0} + \text{Position Setting-byte1} * 256 + \text{Position Setting-byte2} * 65536 + \text{Position Setting-byte3} * 16777216$$

$$\text{Actual Position Setting} = \text{Position Setting}/100$$

Range: -2100000000-2100000000

4.2 Position Max Current Setting(20H)

- Function: Configure the maximum current limit for the target position.
- Register Address: 20H

Address	R/W	Length	Parameter
20	R/W	4 bytes	Current

- Parameters:

Max Current (4byte):

$$\text{Max Current} = \text{Max Current-byte0} + \text{Max Current-byte1} * 256 + \text{Max Current-byte2} * 65536 + \text{Max Current-byte3} * 16777216$$

$$\text{Actual Max Current} = \text{Max Current}/100$$

Range: -120000-120000

4.3 Position Readback(90H)

- Function: Read the current position value.
- Register Address: 90H

Address	R/W	Length	Parameter
90	R	4 bytes	Position Readback

- Parameters:

Position Readback (4byte):

$$\text{Position Readback} = \text{Position Readback-byte0} + \text{Position Readback-byte1} * 256 + \text{Position Readback-byte2} * 65536 + \text{Position Readback-byte3} * 16777216$$
$$\text{Actual Position Readback} = \text{Position Readback}/100$$

4.4 Position PID Configuration(A0H)

- Function: Configure PID parameters for the position control loop.
- Register Address: A0H

Address	R/W	Length	Parameter
A0	R/W	4 bytes	P
A4	R/W	4 bytes	I
A8	R/W	4 bytes	D

- Parameters:

P/I/D (4byte):

$$\text{setting value} = \text{PID-byte0} + \text{PID-byte1} * 256 + \text{PID-byte2} * 65536 + \text{PID-byte3} * 16777216$$

For example: P=0.0000001, P setting value=0.0000001*10000000=1, P-byte0=0x01, Pbyte1=0, P-byte2=0, P-byte3=0

5、 Current Loop Control Instruction Set

5.1 Current Control(B0H)

- Function: Configure the target operating current.
- Register Address: B0H

Address	R/W	Length	Parameter
B0	R/W	4 bytes	Current

- Parameters:

Current (4byte):

$$\text{Current Setting} = \text{Current Setting-byte0} + \text{Current Setting-byte1} * 256 + \text{Current Setting-byte2} * 65536 + \text{Current Setting-byte3} * 16777216$$

$$\text{Actual Current Setting} = \text{Current Setting}/100$$

Range: -120000-120000

5.2 Current Readback(C0H)

- Function: Read the current operating current.
- Register Address: C0H

Address	R/W	Length	Parameter
C0	R	4 bytes	Current

- Parameters:

Current (4byte):

$$\text{Current Readback} = \text{Current Readback-byte0} + \text{Current Readback-byte1} * 256 + \text{Current Readback-byte2} * 65536 + \text{Current Readback-byte3} * 16777216$$

$$\text{Actual Current Readback} = \text{Current Readback}/100$$

6、 Status Read Registers

6.1 Power Vin(34H)

- Function: Read the current input voltage value of the motor (V). The read

value is VIN*100. Refer to the formula below to calculate the actual input voltage.

- Register Address: 34H

Address	R/W	Length	Parameter
34	R/W	4 bytes	VIN

- Parameters:

VIN(4byte):

$$\text{VIN X100} = \text{VIN X100-byte0} + \text{VIN X100-byte1} * 256 + \text{VIN X100-byte2} * 65536 + \text{VIN X100-byte3} * 16777216$$

$$\text{Actual VIN} = \text{VIN X100}/100$$

6.2 Internal Temperature(38H)

- Function: Internal reference temperature value register (°C). The temperature is for internal status reference only and may not be accurate.

- Register Address: 38H

Address	R/W	Length	Parameter
38	R/W	4 bytes	Temperature

- Parameters:

Temperature(4byte):

$$\text{Temp} = \text{Temp-byte0} + \text{Temp-byte1} * 256 + \text{Temp-byte2} * 65536 + \text{Temp-byte3} * 16777216$$

6.3 Encoder Counter(3CH)

- Function: In encoder operating mode, read the encoder value.

- Register Address: 3CH

Address	R/W	Length	Parameter
3C	R/W	4 bytes	Encoder Counter

- Parameters:

Encoder Counter (4byte):

$$\text{Encoder Counter} = \text{Encoder Counter-byte0} + \text{Encoder Counter-byte1} * 256 + \text{Encoder Counter-byte2} * 65536 + \text{Encoder Counter-byte3} * 16777216$$

Counter-byte3 * 16777216

6.4 Save Flash(F0H)

- Function: Save parameters to flash.
- Register Address: F0H

Address	R/W	Length	Parameter
F0	W	1 byte	Save

- Parameters:
Save (1byte): 1

6.5 Firmware Version(FEH)

- Function: Firmware version register.
- Register Address: FEH

Address	R/W	Length	Parameter
FE	R	1 byte	Version

- Parameters:
Version(1byte):
1-127

6.6 I2C Address(FFH)

- Function: Change I2C address.
- Register Address: FFH

Address	R/W	Length	Parameter
FF	R/W	1 byte	Address

- Parameters:
Address(1byte):
1-127