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Emiif

Emiif ZK-SMC02 Stepper Motor Driver Controller

Specifications

- Product Name: SMC02 Motor Controller + Driver
- Operating Interfaces: Operation Interface, [F] Menu Setting Interface
- Adjustable Functions: Forward and Reverse Rotation, Rotation Speed, Cycle Work Times, Delay, Pulse Settings, Action Flow Mode Selection

Disclaimer:
For electronic module products, you need to have a certain electronic foundation and carefully read the product description before use; The product is not designed for medical, life-saving, life support and other purposes, and cannot be used in dangerous places such as coal mine and oil depot. We do not guarantee such responsibilities; The product profit is low, the user's operation ability and use occasions vary greatly, and any electronic equipment cannot be foolproof. The equipment owner shall make corresponding protective measures and risk management plan. The company shall not be liable for compensation for any personal or property loss directly or indirectly caused by the equipment.

Product introduction

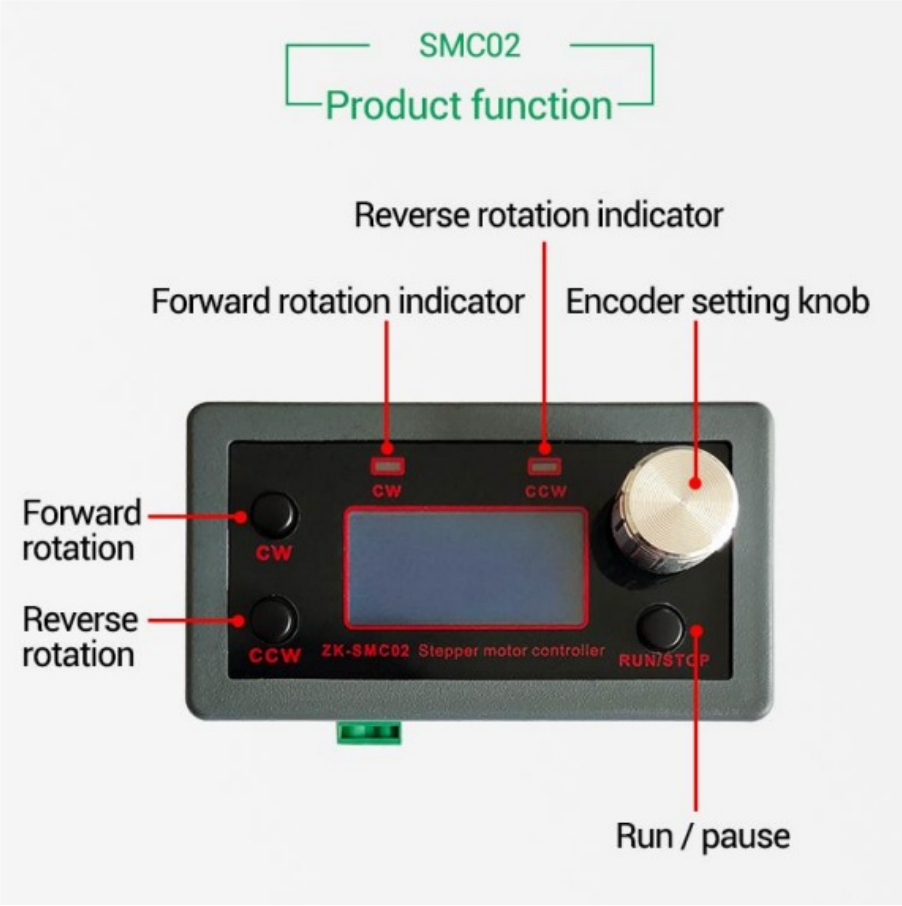
This is a special operation control module for single shaft stepping motor. A variety of fixed operation modes are built in the module, and users can quickly select the appropriate motion track. The distance / speed / delay / number of cycles can be saved and set after power down. It can run independently as a module, or it can be used together with other systems. It can be used in general industrial control occasions, not in special industries such as medical treatment and fire protection or life-threatening fields.

Product parameters

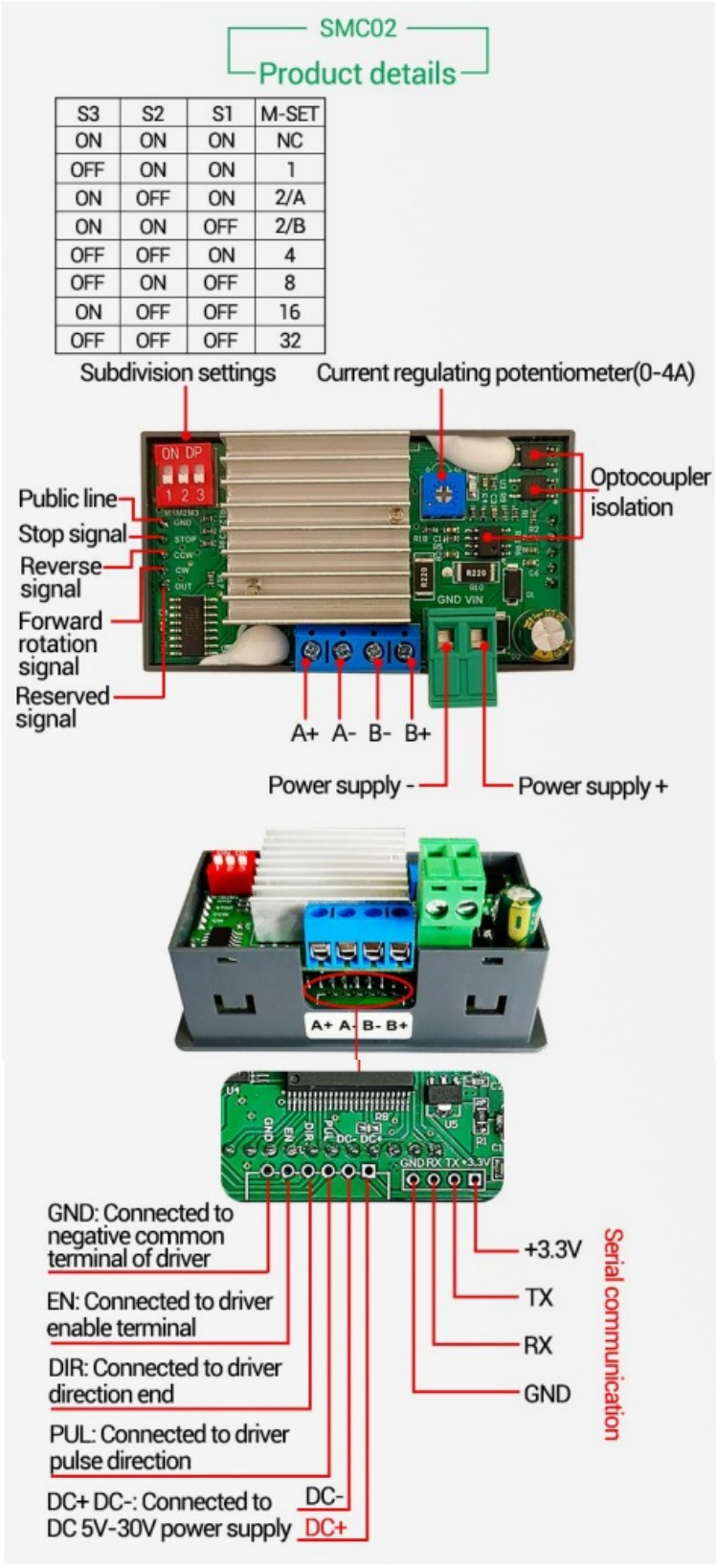
- Model: ZK-SMC02 stepper motor controller + driver
- Adaptive motor: stepping motor
- Number of control axes: single axis
- Motor signal: common cathode
- Power supply range: DC 10-30V general
- Driving capacity: 4A

- Instruction features: streamline and optimize multiple common instructions
- Acceleration and deceleration control: Yes
- Input reverse connection protection: Yes
- Remote communication control: TTL serial port
- Main functions of the system: automatic, manual, setting and serial port control
- Speed range: 0.1 ~ 999 laps / min Number of forward rotation pulses: 1-9999999 pulses
- Number of reverse pulses: 1-9999999 pulses
- Number of cycles: 1-9999
- Forward rotation delay time: 0.0-999.9 seconds
- Reverse delay time: 0.0-999.9 seconds
- Subdivision selection range: 1-128 subdivision
- Product service environment: – 5 ℃ – 60 ℃ (no condensation)

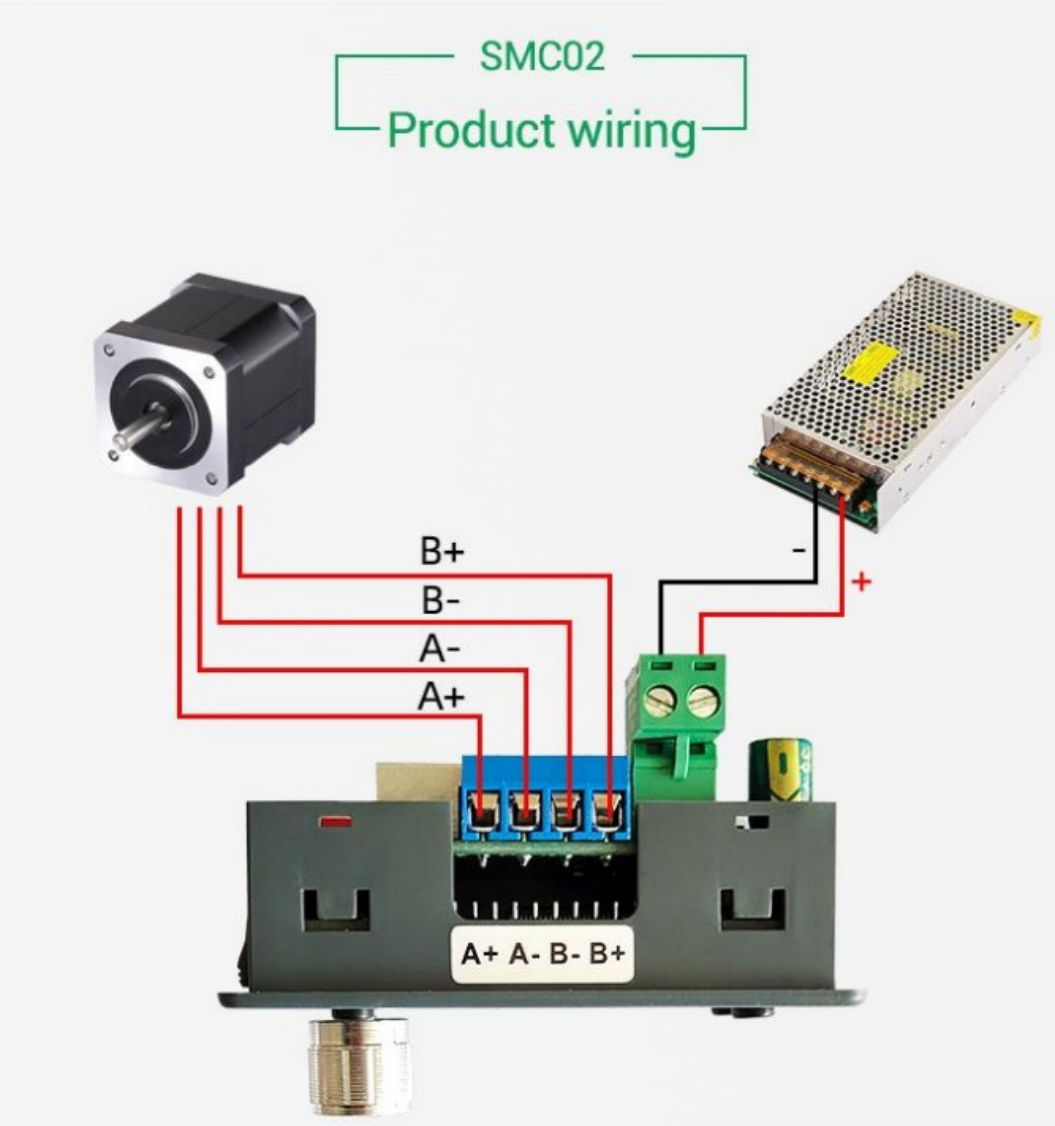
Product function



Product details



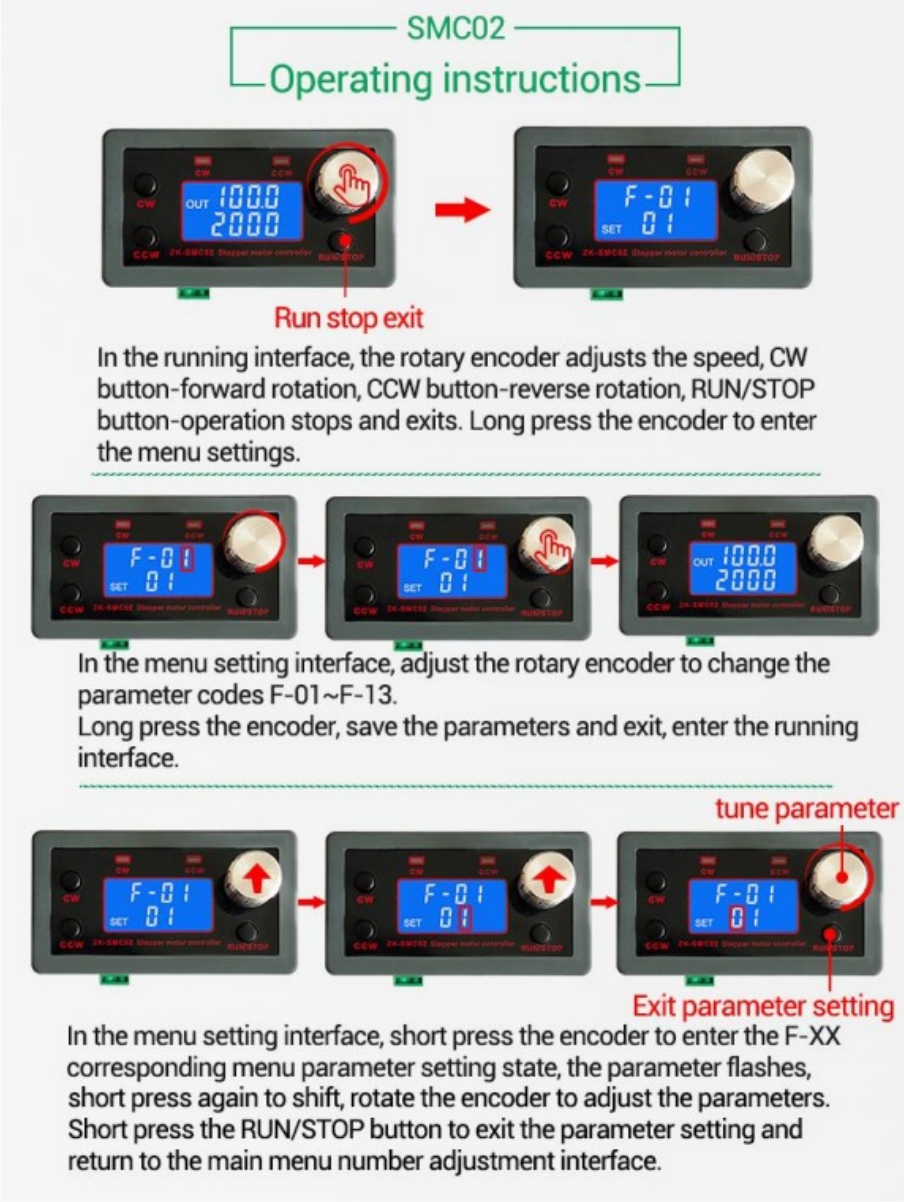
Product wiring



Interface function introduction and operation method

The controller is divided into two interfaces: operation + interface+[F] menu setting interface

Operating instructions



List of all [F] menu setting functions

Serial number	Function	Adjustable range	Defaults
F-01→?	Action flow mode selection(details below thetable)	1-9	1
F-02	Number of forward rotation pulses Unit: number (the upper three bits are adjusted by rotary encoder shift, and the upper three bitsdisplay Hxxx, and the lower four bits display xxxx)	1 – 9999999	1600

F-03	Forward rotation speed Unit: Revolution / minute	0.1-999	10
F-04	Number of reverse pulses Unit: Number (the upper three bits are adjusted by rotary encoder shift, and the upper three bits display Hxxx, andthe lower four bits display xxxx)	1 – 9999999	1600
F-05	Reversal speed Unit: circle (revolution)/ min	0.1-999	10
F-06	Cycle work times (among them—=numeroustimes) Unit: times	0-9999 or countlesstimes	1
F-07	Forward rotation in place delay Unit: secondaccuracy ± 0.2 second	0.0-999.9	0.0
F-08	Reverse in place delay Unit: second accuracy ± 0.2second	0.0-999.9	0.0
F-09	Number of pulses per revolution: 1-9999 (X10) Unit: 10 (for example, the step angle is 1.8 degrees, the stepping motor drives 8 segments, and one revolution is 360 / 1.8 * 8= 1600, setting 160, actual 1600)	1-9999	160
F-10	Main interface display contentUp: motor coil speed (unit: RPM) Downlink: delay time (unit: s) / number of cycles (unit: Times) 00- Motor coilspeed delay time 01- Motor coilspeed cycle times	0-1	00

F-11	Action when pressing pause key0 – slow stop of motor deceleration1 – motor stop simmediately (emergency stop has impact)	0-1	0
F-12	Acceleration and deceleration level 1-100, 1slowest, 100 fastest	1-100	20
F-13	Postal address	1-255	1

F01 action process mode selection list of required action processes

number	**Action description**
F01 →P01	The motor works with [knob on controller].
F01 →P02	It keeps rotating after pressing the button, and stops when it is released. [Press CW]Always rotate forward [Press CCW] Always reverse
F01 →P03	After pressing the button, keep rotating, Press STOP to stop. [press CW] forward rotation[press CCW] reverse rotation
F01 →P04	After pressing the button, it can rotate forward or reverse-delay according to the set distance, and it can cycle F-06 times. [Press CW] Forward rotation-Delay (F-07) [PressCCW] Reverse rotation-Delay (F-08)
F01 →P05	After pressing the button, it can cycle according to the set distance forward or reverse delay(F-06 Return to zero at the end of the cycle. [press CW] forward rotation delay (F-07), Cycle (F-06), return to zero [press CCW] reverse delay (F-08),Cycle (F-06), return tozero.

F01 →P06	After pressing the button, cycle forward and reverse according to the set distance.Abbreviations: [press CW] forward delay (F-07) – reverse delay (F-08), [press CCW] reverse delay (F-08) – forward delay (F-07), above cycle (F-06)
F01 →P07	After pressing the button, the motor will rotate forward or reverse permanently, release the button, – delay – return to zero. Abbreviations: [press CW] forward rotation – release – delay (F-07) – return to zero, [press CCW] reverse rotation – release – delay (F-08) – returnto zero.
F01 →P08	After pressing the button, forward or reverse – delay according to the set time.

	Recyclable (F-06). Abbreviations: [press CW] forward rotation time (F-07) – delay (F-08), [press CCW] reverse rotation time (F-08) – delay (F-07), the above cycle (F-06).
F01 →P09	After power on, it will automatically cycle forward and reverse according to the set distance. Abbreviations: forward delay (F-07) – reverse delay (F-08), cycle (F-06)

Product size

SMC02 Stepper motor controller communication protocol

V1.0

Protocol Introduction

Using TTL serial transmission interface and MODBUS-RTU communication protocol, this product only supports function codes 0x03, 0x06, and 0x10.

Introduction to Communication Protocol

Information transmission is asynchronous in Modbus-RTU mode

Starting bit	1 bit
Data bits	8 bit
Parity bit	not have
Stop bit	1 bit

Data frame structure

Data frame interval	Address code	function code	data area	CRC check
3.5 bytes or more	1 byte	1 byte	N byte	2 byte

Before sending data, it is required that the data bus rest time, i.e. no data transmission time, be greater than 3.5 (e.g. 5ms at a baud rate of 9600). Message transmission must start with a pause interval of at least 3.5 bytes, and the entire message frame must be treated as a continuous data transmission stream. If there is a pause time of more than 3.5 bytes before the frame is completed, The receiving device will refresh incomplete messages and assume that the next byte is the address field of a new message. Similarly, if a new message starts with the previous message within less than 3.5 characters, the receiving device will consider it a continuation of the previous message.

Address Code

The address code is the first byte (8 bits) of each communication information frame, ranging from 1 to 255 (initially set to 1,0 and also the broadcast address). This byte indicates that the slave set by the user will receive information sent by the host. Each slave must have a unique address code, and only slaves that match the address code can respond to feedback messages. When the slave sends back information, the returned data starts with their respective address codes. The address code sent by the host indicates the slave address to be sent, while the address code returned by the slave indicates the slave address to be returned. The corresponding address code indicates where the information comes from. 1.2 Function Code

The function code is the second byte transmitted in each communication information frame, and the ModBus communication protocol can define function codes ranging from 1 to 127. Sent as a host request, telling the slave what action to take through a function code. As a response from the slave, the function code returned by the slave is the same as the function code sent from the master, and indicates that the slave has responded to the master and performed relevant operations. This machine only supports function codes 0x03, 0x06, and 0x10.

Function code	Definition	Operation (binary)
0x03	Read register data	Read data from one or more registers
0x06	Preset Single Register	Write a set of binary data into a single register
0x10	Write multiple registers	Write multiple sets of binary data into multiple registers

Register

Introduction to Protocol Registers (Data within a Single Register Address is Double Byte Data)

Name	Illustrate	Byte count	Reading and writing	Register address
System parameters, written will be stored				
F-01	Action process mode selection	2	R/W	0000H
F-02	Number of forward pulses	4	R/W	0001H
F-03	Forward rotation speed	2	R/W	0003H
F-04	Reverse pulse count	4	R/W	0004H
F-05	Reverse speed	2	R/W	0006H
F-06	Number of working cycles	2	R/W	0007H
F-07	Forward to position delay	2	R/W	0008H

F-08	Reverse in place delay	2	R/W	0009H
F-09	Number of pulses per revolution	2	R/W	000AH
F-10	Main interface display content	2	R/W	000BH
F-11	Action when pressing the pause button	2	R/W	000CH
F-12	Acceleration and deceleration levels	2	R/W	000DH
F-13	Module address 1-255	2	R/W	000EH
COM	Control command 0 using serial port instead of 1 using serial port control	2	R/W	000FH
Read information and run information				
	Current motor operating status: 00- stop 01- acceleration status 02- deceleration status 03- constant speed status	2	R	0010H
	Current motor rotation direction: 00- forward rotation 01- reverse rotation	2	R	0011H
Serial Port Control Run Command (Set COM (000F) address to 1 serial port control mode before serial port control				
Serial Port Control Run Command	Serial port control operation mode 00- forward rotation 01- reverse rotation 02- slow stop 03- immediate stop 0xFF – default state after execution	2	R/W	0100H
	Serial port control for running, 00- no permanent rotation 01- enable permanent rotation default 0	2	R/W	0101H

	The distance of the serial port control operation is 16 bits higher than the pulse count (which works under permanent rotation), with a default of 10000 bits	2	R/W	0102H
	The distance of the serial port control operation is 16 bits lower than the pulse count (which works under permanent rotation), with a default of 10000 bits	2	R/W	0103H
	The acceleration and deceleration levels controlled by serial port are 1-100, with a default of 20	2	R/W	0104H
	The default running speed for serial port control is 100	2	R/W	0105H

Example 1: Reading System Parameters (F-01 to F-02) Using the [03 (0x03) Read Holding Register] instruction Host sending

01	03	00 00	00 02	C4 0B
Slave address	Function code (Read Register)	Starting address The regulation is 2 bytes	Number of Registers	CRC Check Code

The controller responds

01	03	04	00 01 06 40	A9 A3

Slave address	Function code (Read Register)	Number of Registers x2	Register value Quantity=Number of registers x2	CRC Check Code

Example 2: Serial port controller operation

1. Set the controller to serial port control mode

Host sending

01	06	00 0D	00 01	D9 C9
Slave address	Function code	Starting address The regulation is 2 bytes	Write value Quantity: 2 bytes	CRC Check Code

The controller responds

01	06	00 0D	00 01	D9 C9
Slave address	Function code	Starting address The regulation is 2 bytes	Write value Quantity: 2 bytes	CRC Check Code

Modifying parameters for serial port control operation

Host sending

01	10	01 02	00 02	04	00 00 4E 20	4B 9E

Slave	Functio n	Starting	Number of	Byte	Write value	CRC
addres s	code	address The regulation is 2 bytes	registers	count	Quantity:=Byte s	Check Code

The controller responds

01	10	01 02	00 02	E1 F4
Slave addre ss	Function co de	Starting addres s The regulation is 2 bytes	Number of registers	CRC Check Code

Serial port control forward conversion

Host sending

01	06	01 00	00 00	88 36
Slave address	Function code	Starting address The regulation is 2 bytes	Write value Quantity:=Byte s	CRC Check Code

The controller responds

01	06	01 00	00 00	88 36
Slave address	Function code	Starting address The regulation is 2 bytes	Write value Quantity:= Bytes	CRC Check Code

Serial port control operation command (set 000F to 1 serial port control mode before serial port control)				
Serial	Control method 0 Manual control 1	2	R/W	000FH
Port	Remote control from upper computer			
Control	Serial port reading operation	2	R/W	0100H
Run	status 00- forward rotation 01-			
Command	reverse rotation 03- stop			
	immediately			
	The number of pulses for serial	2	R/W	0101H
	port control operation is 16 bits			
	high, with a default of 10000 bits			
	The default number of pulses for	2	R/W	0102H
	serial port control operation is			
	10000 if the low 16 bits are used			

	The acceleration and deceleration	2	R/W	0103H
	levels controlled by serial port			
	are 1-100, with a default of 20			
	The default running speed for	2	R/W	0104H
	serial port control is 100			

1. Set the remote control mode of the upper computer (default address 01) 01 06 00 0F 00 01 48 0A
2. Set forward, reverse, and stop 01 10 01 01 00 00 00 27 10 01 64 CRCH CRCL

FAQs

- **Q: How do I set the motor to rotate in a specific direction?**
  A: Use the forward rotation speed setting for clockwise rotation and the reverse rotation speed setting for counterclockwise rotation.
- **Q: What is the purpose of the cycle work times setting?**
  A: The cycle work times setting allows you to specify the number of repetitive cycles the motor should perform before stopping.

Documents / Resources

	Emiif ZK-SMC02 Stepper Motor Driver Controller [pdf] Installation Guide ZK-SMC02, ZK-SMC02 Stepper Motor Driver Controller, ZK-SMC02, Step per Motor Driver Controller, Driver Controller, Controller

References

- User Manual

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controller, Driver Controller, Emiif, Stepper Motor Driver Controller, ZK-SMC02, ZK-SMC02 Stepper Motor Driver Controller

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