SMC02 Motor Controller + Driver Integrated Manual



Description

This is a computing control module specifically designed for single-axis stepper motors. The module has built-in multiple fixed operating modes, allowing users to quickly select the appropriate motion trajectory and save settings upon power-off. It supports setting distance/speed/delay/cycle times. For electronic module products, a certain level of electronics knowledge is required, and please read the product description carefully before use. This product is not designed for medical, life-saving, or life-sustaining applications and must not be used in dangerous places such as coal mines or oil depots. If you encounter any issues during use, please feel free to contact our after-sales support at CavalliFun@gmail.com, and we will respond to your email as soon as possible.

1. 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.

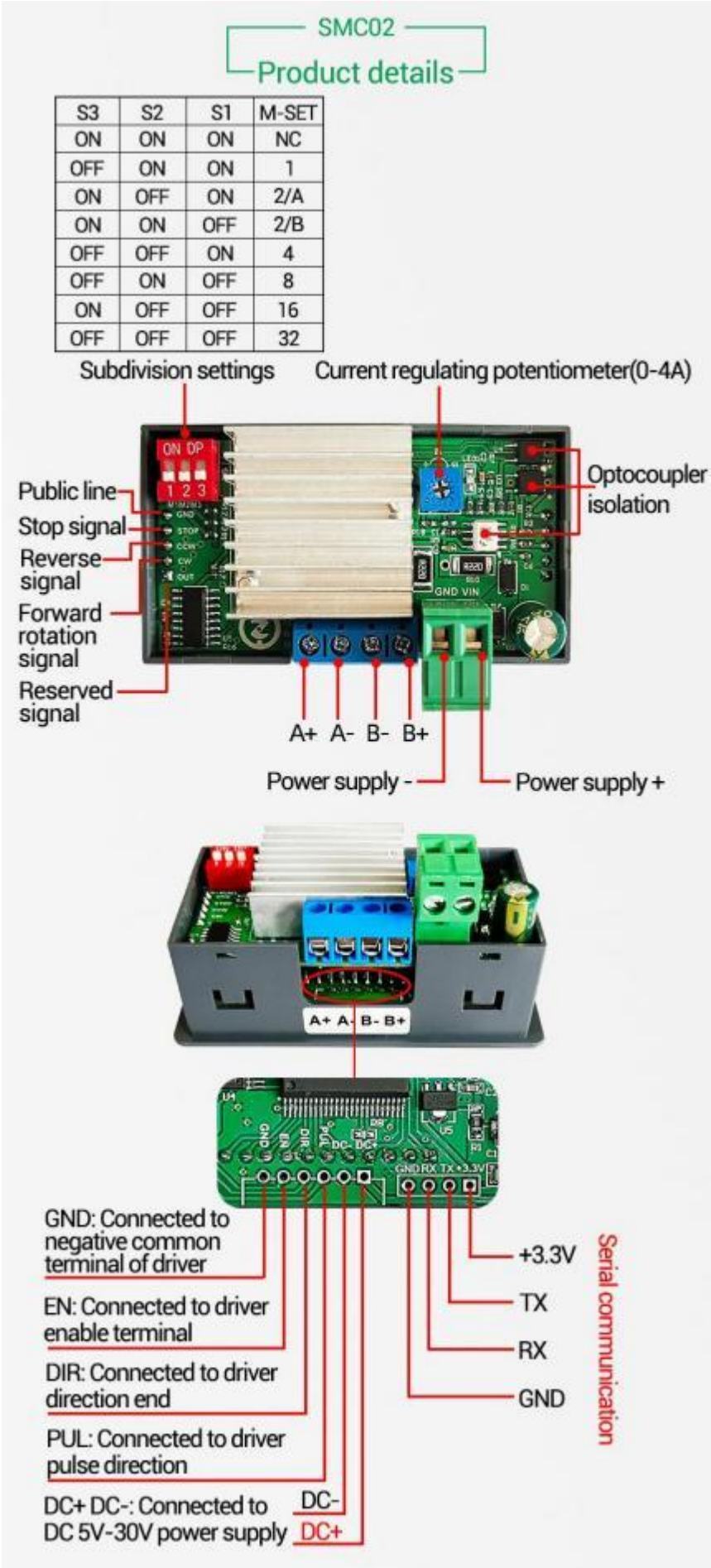
2. Product parameters

1. Model: Stepper Motor Controller + Driver
2. Suitable Motor: 42/57 step motor(Nema17/23 motor)
3. Number of Axes: Single-axis
4. Motor Signal: Common Cathode
5. Power Supply Range: DC 5-30V Universal
6. Driving Capability: 4A (Max)
7. Command Features: Streamlined optimization of multiple commonly used commands
8. Acceleration/Deceleration Control: Yes
9. Reverse Input Protection: Yes
10. Remote Communication Control: TTL Serial
11. System Main Functions: Automatic, Manual, Setting, and Serial Control
12. Speed Range: 0.1-999 circle/minute
13. Forward/Reverse Pulse Count: 1-9,999 pulses
14. Reverse Pulse Count: 1-9,999 pulses
15. Cycle Work Times: 1-9,999 times
16. Forward/Reverse Delay Time: 0.1-999 seconds
17. Reverse Delay Time: 0.1-999 seconds
18. Subdivision Selection Range: 1-32
19. Subdivision: 1/2/4/8/16/32
20. Operating Environment Range: -5°C-60°C (no condensation)

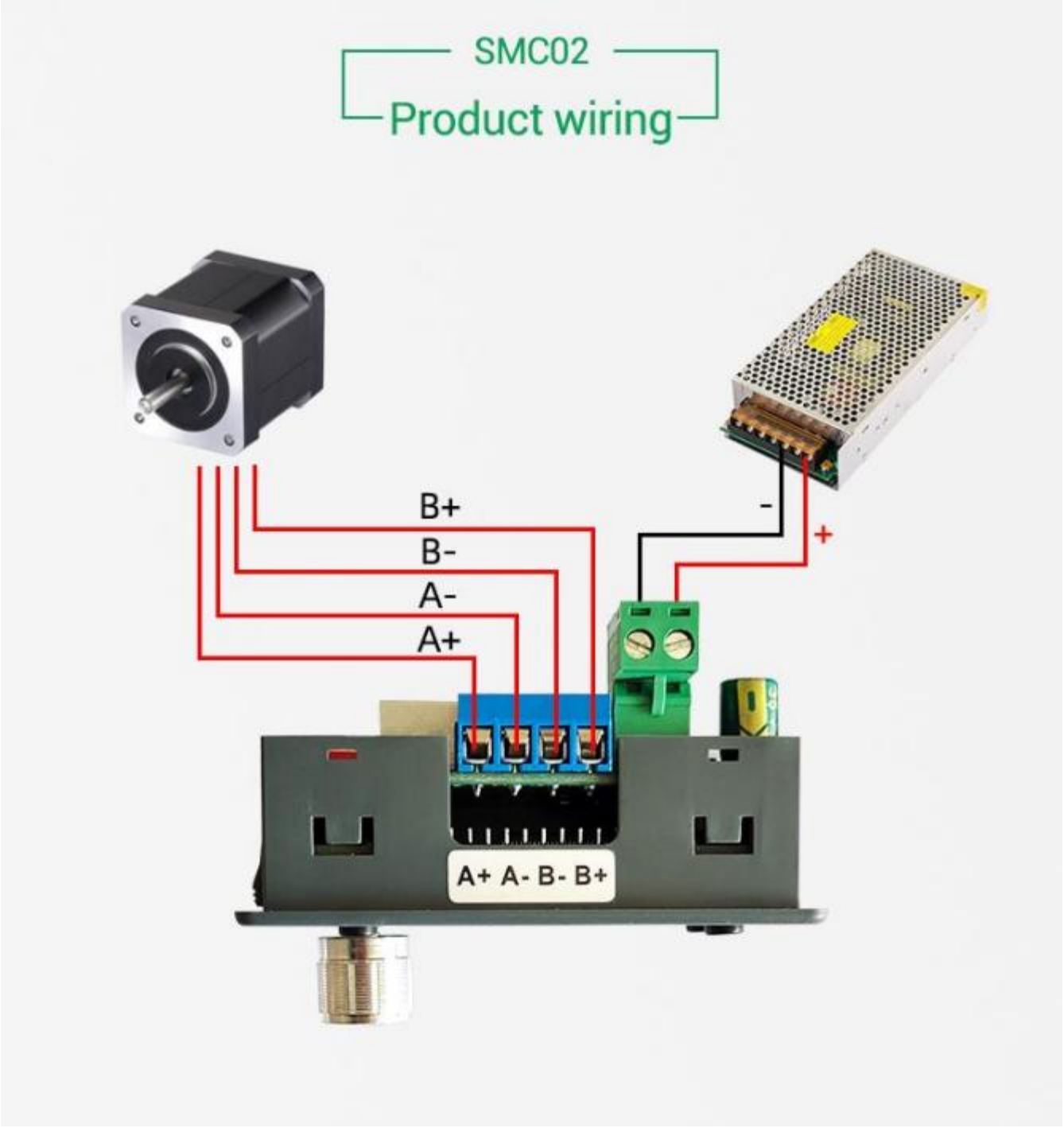
3. Product function



4. Product details



5. Product wiring



6. Interface function introduction and operation method

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



Operating instructions

SMC02

Operating instructions



In the running interface, the rotary encoder adjusts the speed, CW button-forward rotation, CCW button-reverse rotation, RUN/STOP button-operation stops and exits. Long press the encoder to enter the menu settings.



In the menu setting interface, adjust the rotary encoder to change the parameter codes F-01~F-13.
Long press the encoder, save the parameters and exit, enter the running interface.



In the menu setting interface, short press the encoder to enter the F-XX corresponding menu parameter setting state, the parameter flashes, short press again to shift, rotate the encoder to adjust the parameters. Short press the RUN/STOP button to exit the parameter setting and return to the main menu number adjustment interface.

List of all [F] menu setting functions

Serial number	Function	Adjustable range	Defaults
F-01—?	Action flow mode selection(details below the table)	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 bits display 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, and the 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----=numerous times) Unit: times	0-9999 or countless times	1
F-07	Forward rotation in place delay Unit: second accuracy ± 0.2 second	0.0-999.9	0.0
F-08	Reverse in place delay Unit: second accuracy ± 0.2 second	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 content Up: motor coil speed (unit: RPM) Downlink: delay time (unit: s) / number of cycles (unit: Times) 00- Motor coil speed delay time 01- Motor coil speed cycle times	0-1	00
F-11	Action when pressing pause key0 - slow stop of motor deceleration1 - motor stops immediately (emergency stop has impact)	0-1	0
F-12	Acceleration and deceleration level 1-100, 1 slowest, 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 Dreleased. [Press CW] Always rotate forward D[Press CCW] Always reverse
【F01】→ P03	After pressing the button, keep rotating, Press STOP to stop. D[press CW] forward rotation [press CCW] reverse rotation
【F01】→ P04	After pressing the button, it can rotate forward or reverse-delay Daccording to the set distance, and it can cycle F-06 times. D[Press CW] Forward rotation-Delay (F-07) D[Press CCW] Reverse rotation-Delay (F-08)
【F01】→ P05	After pressing the button, it can cycle according to the set distance fDorward or reverse delay(F-06)。 Return to zero at the end of the Dcycle. [press CW] forward rotation delay (F-07), Cycle (F-06), return to Dzero [press CCW] reverse delay (F-08),Cycle (F-06), return to zero.
【F01】→ P06	After pressing the button, cycle forward and reverse according to the Dset distance. Abbreviations: [press CW] forward delay (F-07) - reverse Ddelay (F-08), [press CCW] reverse delay (F-08) - forward delay (F-07), Dabove cycle (F-06)
【F01】→ P07	After pressing the button, the motor will rotate forward or reverse Dpermanently, release the button, - delay - return to zero. DAbbreviations: [press CW] forward rotation - release - delay (F-07) - Dreturn to zero, [press CCW] reverse rotation - release - delay (F-08) -Dreturn to zero.
【F01】→ P08	After pressing the button, forward or reverse - delay according to the Dset time.

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

7. Product size



SMC01 Stepper motor controller communication protocol V1.0

1. Protocol introduction

TTL serial port transmission interface is adopted ,and the communication protocol is MODBUS-RTU protocol. This product only supports function codes 0x03, 0x06 and 0x10.

2. Introduction to communication protocol

Information transmission is asynchronous mode ,Modbus-RTU mode.

Start bit	1
Data bit	8
Parity bit	No
Stop bit	1

Data frame structure

Data frame interval	Address code	Function code	Data area	CRC check
More than 3.5 bytes	1 byte	1 byte	N byte	2 byte

Before sending data, the data bus quiescent time is required, i.e. no data transmission time is greater than 3.5 (e.g. 5ms when the baud rate is 9600). The message transmission must start with a pause interval of 3.5 bytes at least. The whole message frame must be used 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 the incomplete message 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.

2.1 address code

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

2.2 function code

The function code is the second byte transmitted in each communication information frame, and the function codes that can be defined by Modbus communication protocol are 1 to 127. It is sent as a master request and tells the slave what action to perform through the function code. As a slave response, the function code returned by the slave is the same as the function code sent from the host, and indicates that the slave has responded to the host and has carried out relevant operations. This machine only supports 0x03, 0x06 and 0x10 function codes.

Function code	definition	Operation (binary)
0x03	Read register data	Read data from one or more registers
0x06	Write a single register	Writes a set of binary data to a single register
0x10	Write multiple registers	Write multiple sets of binary data to multiple registers

2.3 register

Introduction to protocol register (the data in a single register address is double byte data)

name	explain	Number of bytes	Read-ing and writ-ing	Register address
System parameters will be written and stored				
F-01	Action flow mode selection	2	R/W	0000H
F-02	Number of forward rotation pulses	2	R/W	0001H
F-03	Forward rotation speed (X10)	2	R/W	0002H
F-04	Number of reverse pulses	2	R/W	0003H
F-05	Reverse speed (X10)	2	R/W	0004H
F-06	Number of cycles	2	R/W	0005H
F-07	Forward rotation in place delay (X10)	2	R/W	0006H
F-08	Reverse in place delay (X10)	2	R/W	0007H
F-09	Number of pulses per revolution	2	R/W	0008H
F-10	Main interface display content	2	R/W	0009H
F-11	Action when pressing pause key	2	R/W	000AH
F-12	Acceleration and deceleration level	2	R/W	000BH
F-13	Module address 1-255	2	R/W	000CH
COM	Use serial port control command 0 instead of 1	2	R/W	000DH
Read operation information				
	Current motor running state: 00 - stop 01 - acceleration 02 - deceleration 03 -	2	R	0010H

	constant speed			
	Current motor running rotation direction: 00 - forward rotation 01 - reverse rotation	2	R	0011H
Serial port control operation command (set com (00 0C) address to 1 serial port control mode before serial port control				
Serial port control operation command	Serial port control operation mode 00 forward rotation 01 reverse rotation 02 slow stop 03 immediate stop	2	R/W	0100H
	Serial port control operation, 00 - no permanent rotation, 01 - enable permanent rotation, default 0	2	R/W	0101H
	The distance pulse number of serial port control operation is 16 bits higher (working under permanent rotation). The default is 10000	2	R/W	0102H
	The distance pulse number of serial port control operation is 16 bits lower (working under permanent rotation). The default is 10000	2	R/W	0103H
	The acceleration and deceleration level of serial port control is 1-100, and the default is 20	2	R/W	0104H
	The running speed of serial port control is 100 by default	2	R/W	0105H

Example 1: read system parameters (F-01 to F-02)

Use the [03 (0x03) read hold register] instruction

Host send:

01	03	00 00	00 02	C4 0B
Slave address	Function code (read register)	Start address The specification 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 Number = number of registers x2	CRC Check code

Example 2: serial port controller operation

1) Set the controller to serial port control mode

Host send:

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

2) Modify the parameters of serial port control operation

Host send:

01	10	01 02	00 02	04	00 00 4E 20	4B 9E
Slave address	Function code	Start address The specification is 2 bytes	Number of registers	Number of bytes	Write value Quantity: = number of bytes	CRC Check code

The controller responds:

01	10	01 02	00 02	E1 F4
Slave address	Function code	Start address The specification is 2 bytes	Number of registers	CRC Check code

3) Serial port control forward rotation

Host send:

01	06	01 00	00 00	88 36
Slave address	Function code	Start address The specification is 2 bytes	Write value Quantity: 2 bytes	CRC Check code

The controller responds:

01	06	01 00	00 00	88 36
Slave address	Function code	Start address The specification is 2 bytes	Write value Quantity: 2 bytes	CRC Check code