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English manual of smc01 controller

Physical button | LCD | Industrial controller **ZK-SMC01**

Single Axis Stepping Motor Controller

Pulse / direction control • Auto / manual • TTL serial communication



- ✓ Adjustable Delay
- ✓ Speed Regulation
- ✓ Angle Adjustment
- ✓ Adjusting Distance

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.

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

Model: ZK-SMC01 stepper motor controller

Adaptive motor: stepping motor

Number of control axes: single axis

Motor signal: common cathode

Power supply range: DC 5-30V general

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

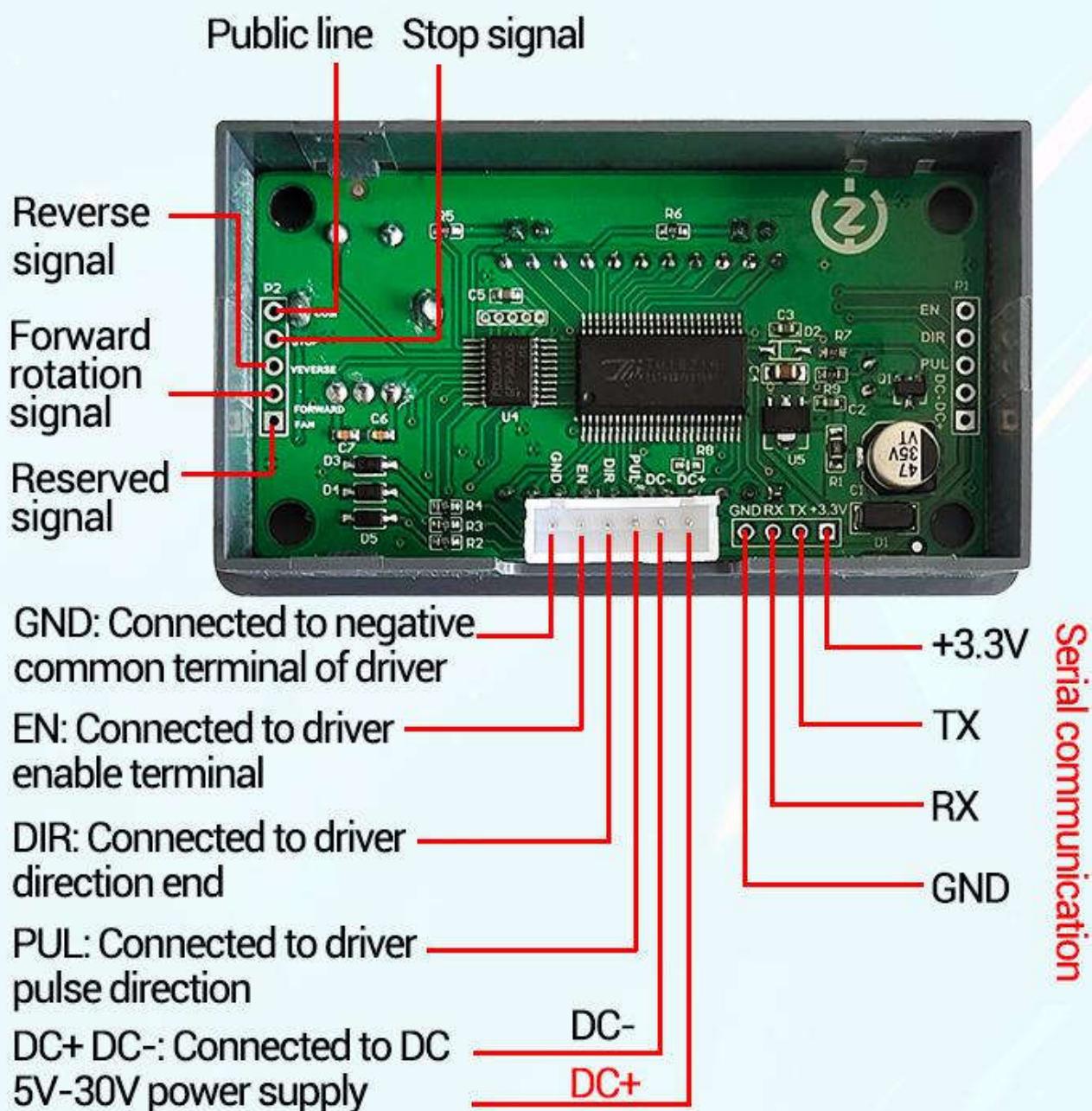
Product service environment: - 5 °C - 60 °C (no condensation)

3. Product function



4. Product details

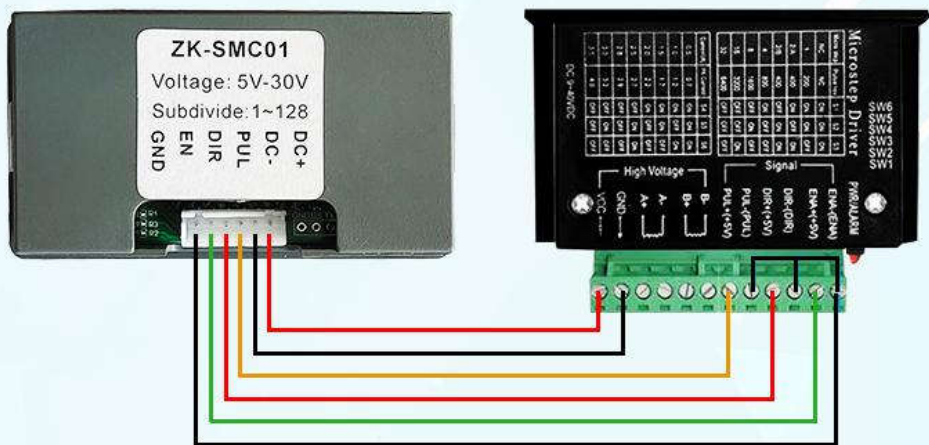
Product details



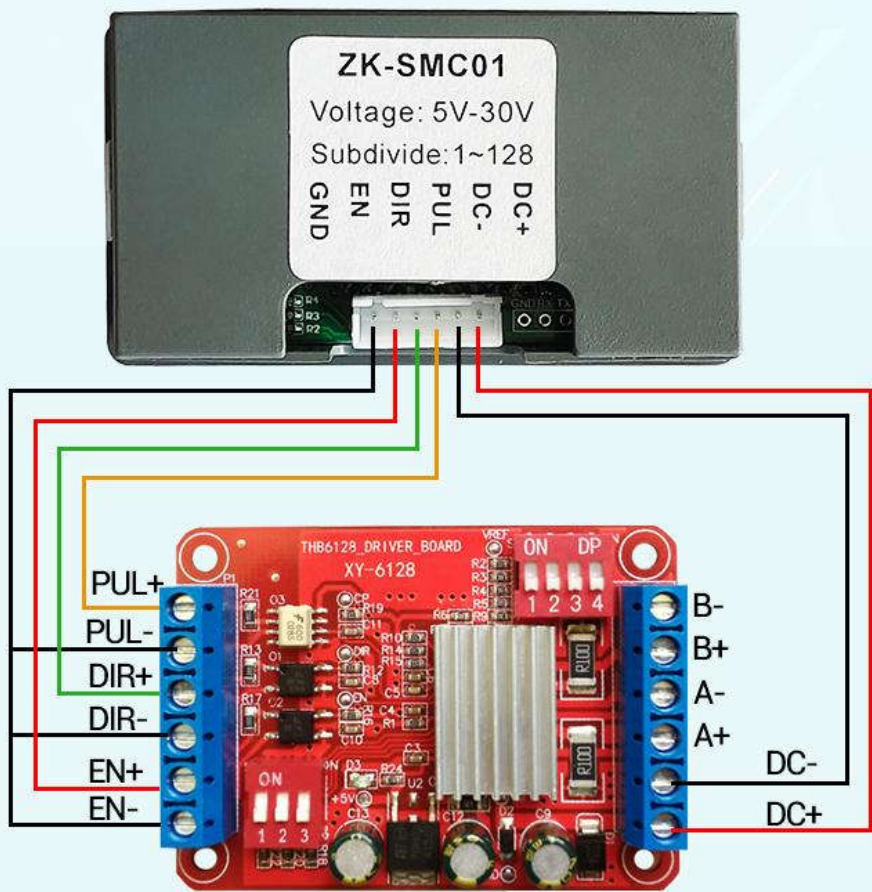
5. Product wiring

Product wiring

Control common drives in the market



Control THB6128 stepper motor driver



6. Interface function introduction and operation method

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

Interface function



RUN INTERFACE

Used to display running information during work



MENU SETTING INTERFACE

In actual work, the parameters that need to be modified are all concentrated here.

Operating instructions

Operating instructions



Run stop exit

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.



Exit parameter setting

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 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) [Press CCW] 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 to zero.
【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) -Return to 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)

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.

2.2function 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	Reading and writing	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 - constant speed	2	R	0010H
	Current motor running rotation	2	R	0011H

	direction: 00 - forward rotation 01 - reverse rotation			
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