STEPPERONLINE®

ST-C01 controller

Physical button / LCD / Industrial controller

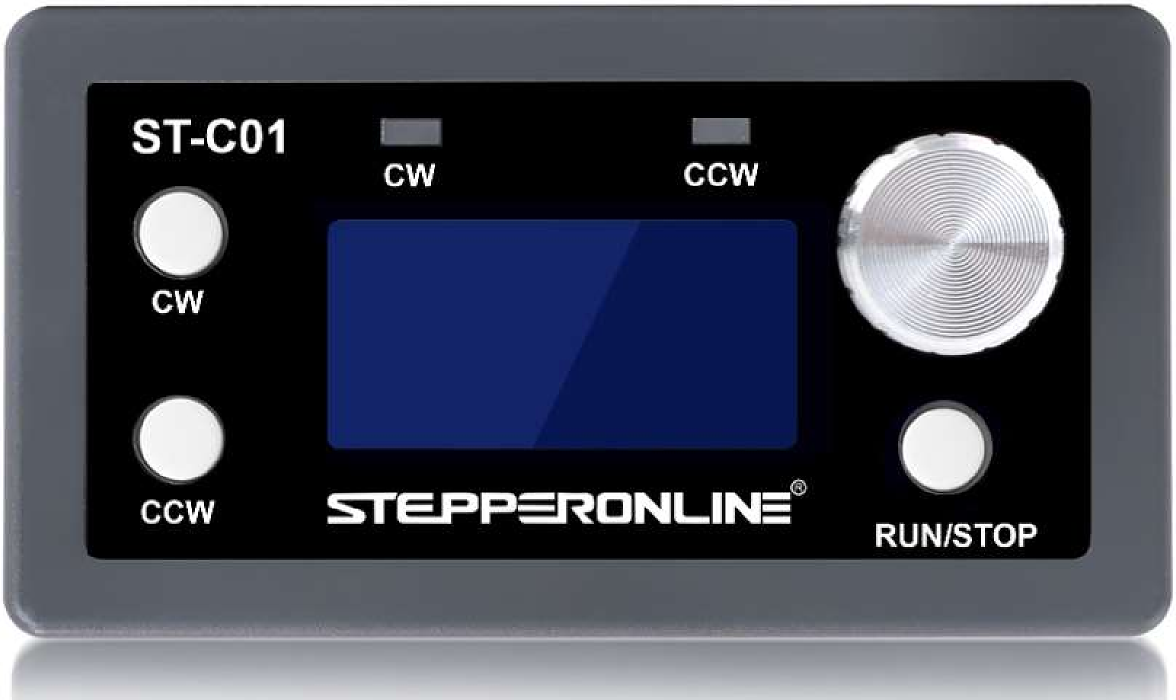
ST-C01

Single Axis Stepping Motor Controller

Pulse / direction control

Auto / manual

TTL serial communication



Adjustable ☑ Delay

Adjustable ☑ Speed

Adjustable ☑ Angle

Adjustable ☑ Distance

1. Product introduction

This is a special operation control module for single shaft stepping motor.

The module has a variety of built-in fixed operation modes, so users can quickly select the appropriate motion trajectory. 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 applications, not recommended for medical, fire and other specialised industries or life-critical areas.

2. Product parameters

Model: ST-C01 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

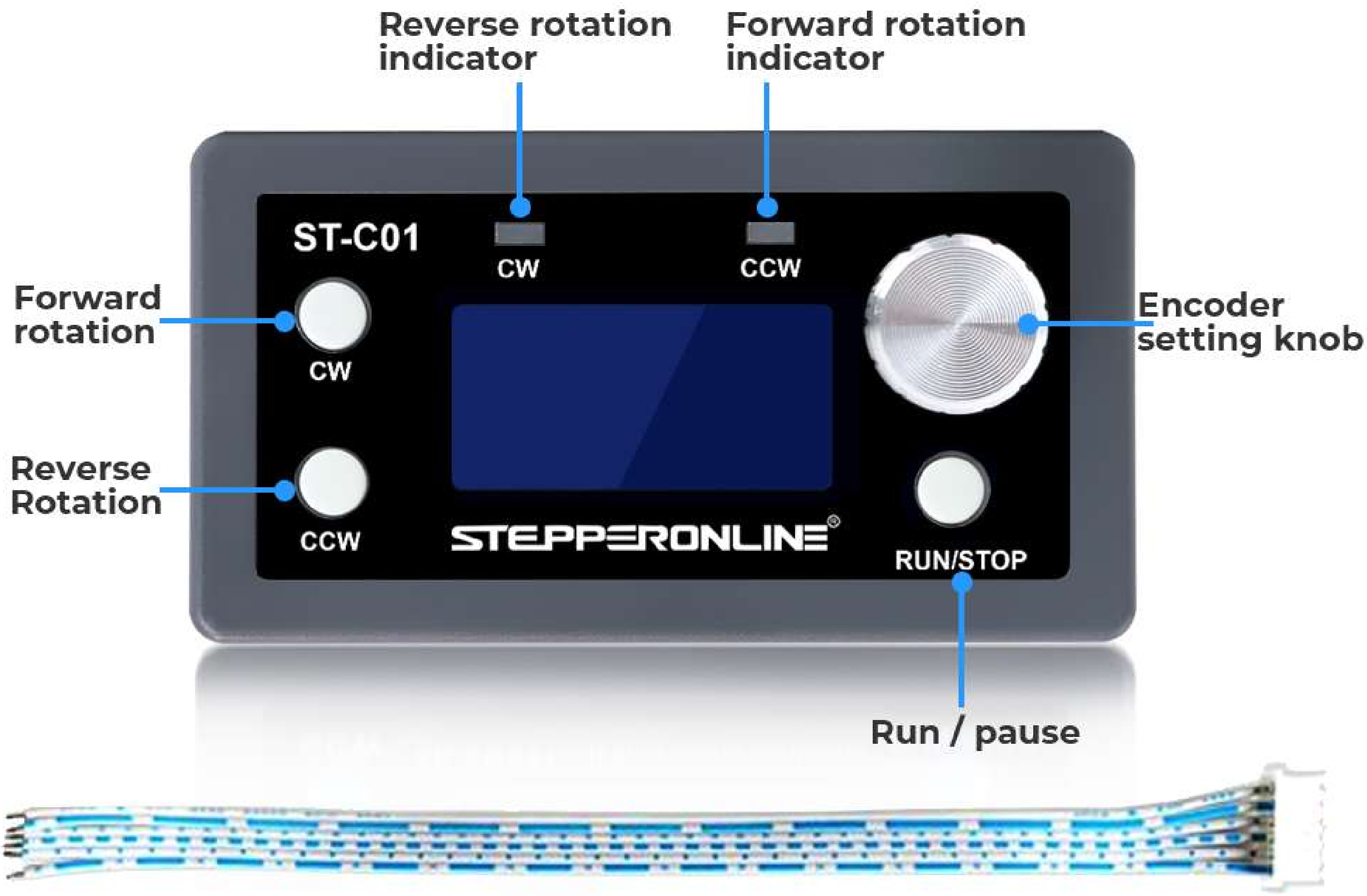
Reverse delay time: 0.0-999.9 seconds

Subdivision selection range: 1-128 subdivision

Product service environment: - 5 ℃ - 60 ℃ (no condensation)

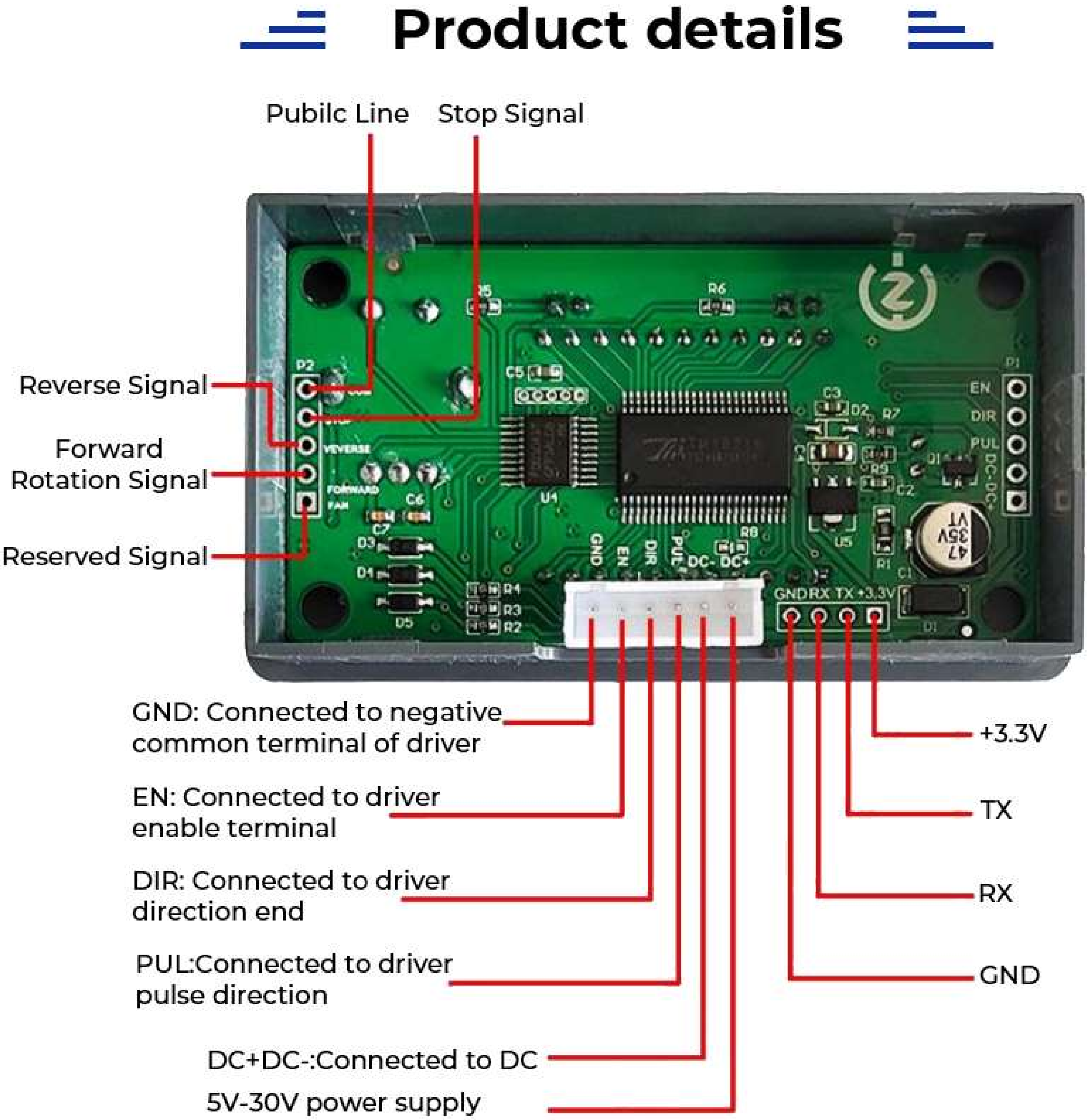
3. Product function

Product Function

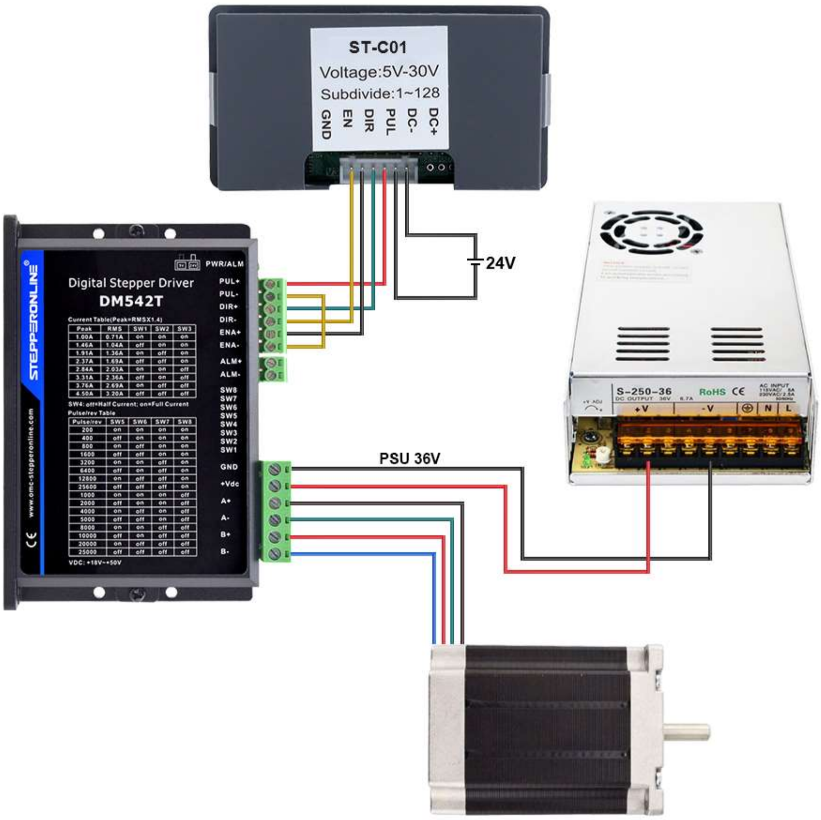


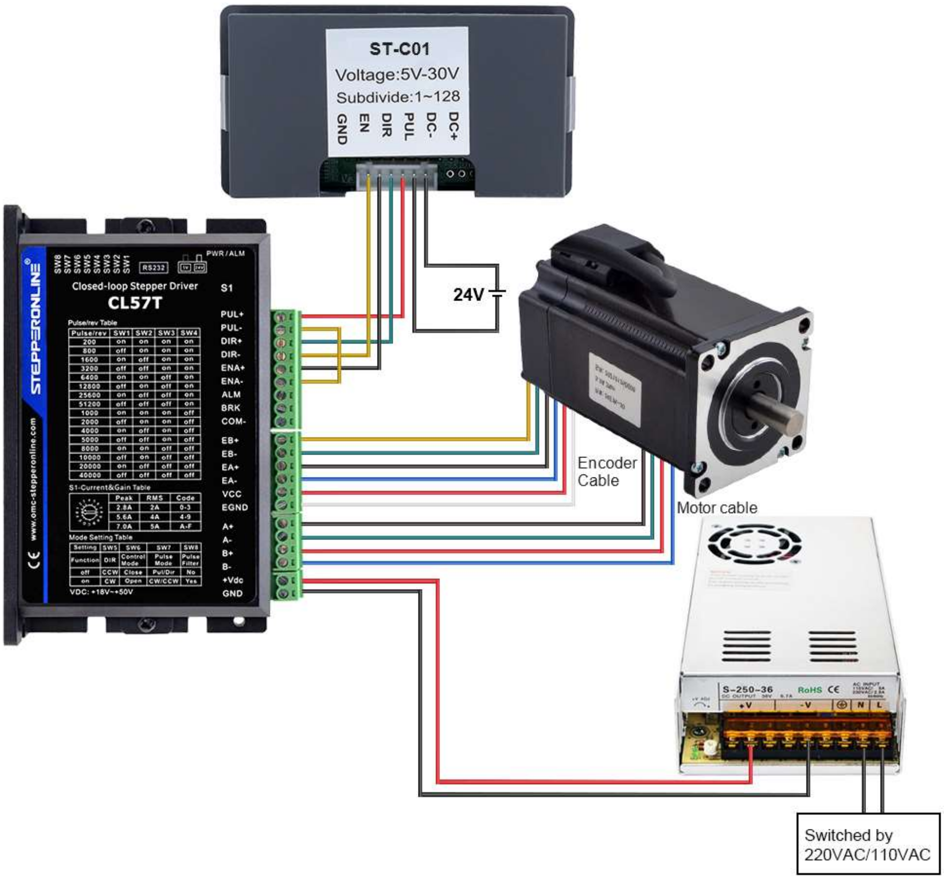
Free matching plug cable

4. Product details


Product details
Pubilc Line
Stop Signal
Reverse Signal
Forward Rotation Signal
Reserved Signal
GND: Connected to negative common terminal of driver
EN: Connected to driver enable terminal
DIR: Connected to driver direction end
PUL:Connected to driver pulse direction
DC+DC-:Connected to DC
5V-30V power supply
+3.3V
TX
RX
GND

5.Product wiring

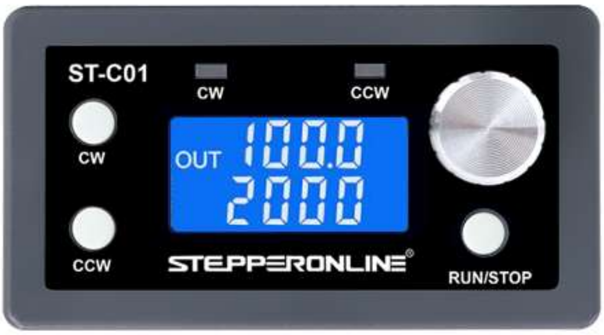



ST-C01
Voltage:5V-30V
Subdivide:1~128
DC+
DC-
PUL
DIR
EN
GND
24V
Closed-loop Stepper Driver
CL57T
S1
PUL+
PUL-
DIR+
DIR-
ENA+
ENA-
ALM
BRK
COM-
EB+
EB-
EA+
EA-
VCC
EGND
A+
A-
B+
B-
+Vdc
GND
VDC: +18V~+50V
Encoder Cable
Motor cable
S-250-36
+V
-V
N
L
Switched by 220VAC/110VAC

6. Interface function introduction and operation method

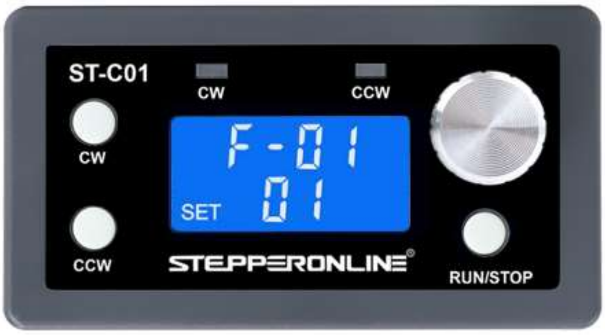
The controller is divided into two interfaces: operation + interface+[F] menu setting interface

Interface function



RUN INTERFACE

Used to display running information during work

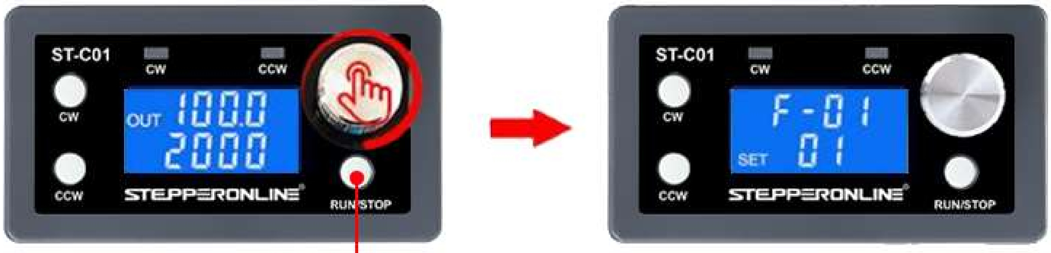


MUNU SETTING INTERFACE

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

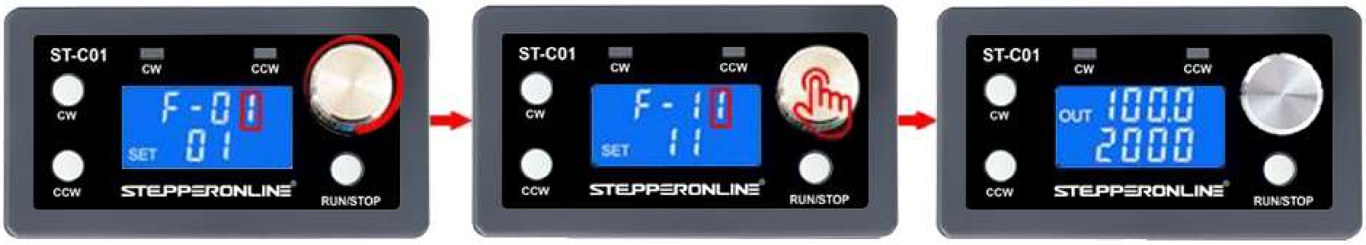
Operating instructions

Operating instructions



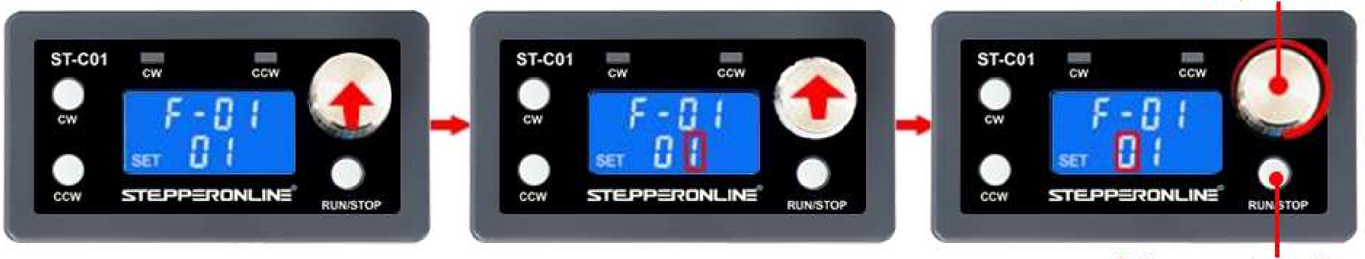
Run stop exit

In the running interface,Turn the knob to adjust 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, Turn the knob to change the parameter codes F-01~F-13. **Long press** the knob, save the parameter and exit, enter the running interface.

Tune parameter



Exit parameter setting

In the menu setting interface, **short press** the knob to enter the F-XX, Corresponding menu parameter setting status. **Short press again** to shift, rotate the knob 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	Function	Adjustable	Defaults
F-01→**?**	Action flow mode selection (See follow-up table)	1-9	1
F-02	Number of forward rotation pulses Unit:number (The upperthreebits 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 (“----”=numerous times) Unit: times	0-9999or 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 key 0 - slow stop of motor deceleration 1 - motor stops immediately	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

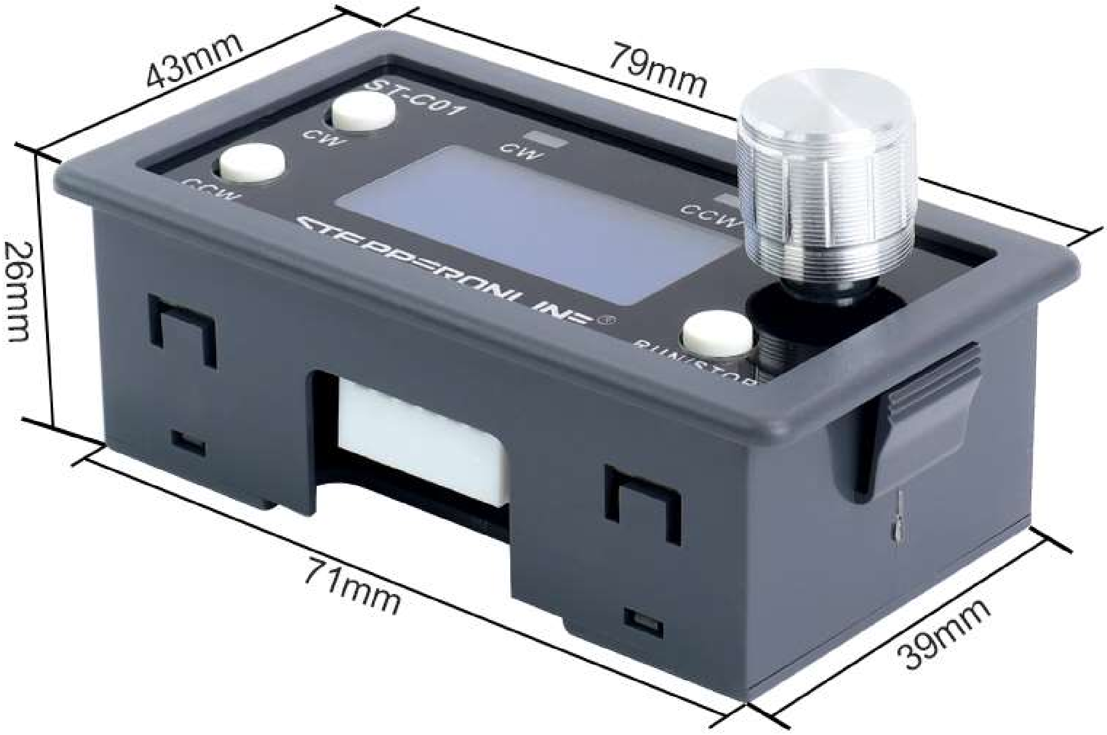
【F01： action process mode selection】list of required action processes

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]
【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. [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. [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). [Press CW] forward rotationtime (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

Product size



Net weight: 36g

Weight: 72g(with packaging)

SMC01 stepper motor controller communication protocol

1.Protocol Introduction

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

2.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.

1.1 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

1.3 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	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	000EH
Read information and run information				
	Current motor operating status: 00- stop 01- acceleration status 02- deceleration status 03- constant	2	R	0010H
	Current motor rotation direction: 00- forward rotation 01- reverse	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 Comman	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

2) Modifying parameters for serial port control operation

Host sending：

01	10	01 02	00	04	00 00 4E	4
Slave address	Function code	Starting address The regulation is 2 bytes	Number of registers	Byte count	Write value Quantity:=Bytes	CRC Check Code

The controller responds：

01	10	01 02	00 02	E1 F4
Slave address	Function code	Starting address The regulation is 2 bytes	Number of registers	CRC Check Code

3) Serial port control forward conversion

Host sending：

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

The controller responds：

01	06	01 00	00 00	88 36
Slave address	Function code	Starting address There gulation 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 Port Control Run Command	Control method 0 Manual control 1 Remote control from upper computer	2	R/W	0101H
	Serial port reading operation status 00- forward rotation 01- reverse rotation 03- stop immediately	2	R/W	0101H
	The number of pulses for serial port control operation is 16 bits high, with a default of 10000 bits	2	R/W	0101H
	The default number of pulses for serial port control operation is 10000 if the low 16 bits are used	2	R/W	0102H
	The acceleration and deceleration levels controlled by serial port are 1-100, with a default of 20	2	R/W	0103H
	The default running speed for serial port control is 100	2	R/W	0104H

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 CRC
```