iCAN *Automation*

CLOSED LOOP STEPPER MOTOR DRIVE

SS86
User manual

Dongguan ICAN Technology Co., Ltd

Closed Loop Stepper Motor Drive

SS86

■ Brief introduction

With high performance encoder, SS86 stepper servo driver gives position feedback signal to Cotex-M4 ARM processor and adjust the location every 50us. It has more accurate control both while running and static positioning compared with many other similar products. SS86is used for 86mm closed loop stepper motor. The Step-Servo is an innovative revolution for the world of stepper motor, it enhances the stepper motors with servo technology to create a product with exceptional feature and broad capability.

- New Cotex-M4 ARM 32bit processor
- Smooth &Accurate
- High Torque
- Output current 8A
- Easy Tunning

- Closed loop
- Low Heating/High Efficiency
- Fast Response
- Resolution is 25600
- Pulse&Dir and CW/CCW control

■ Functional diagram
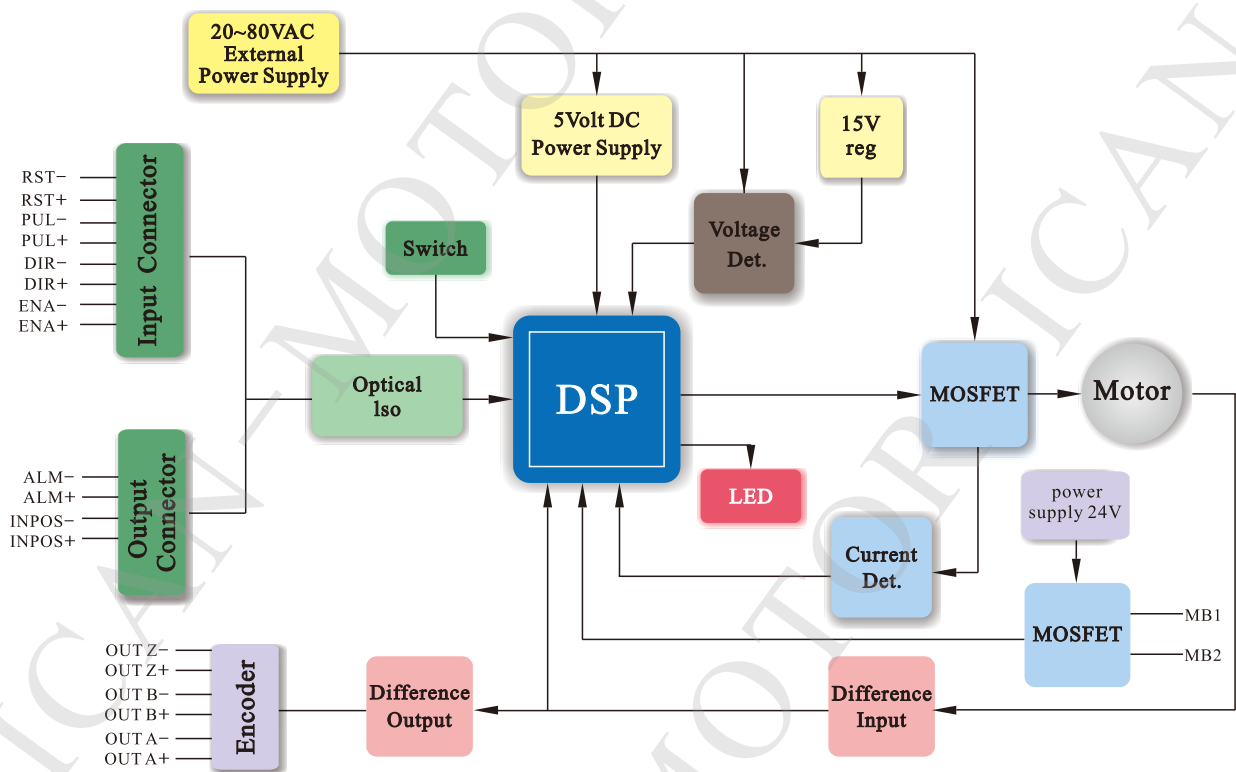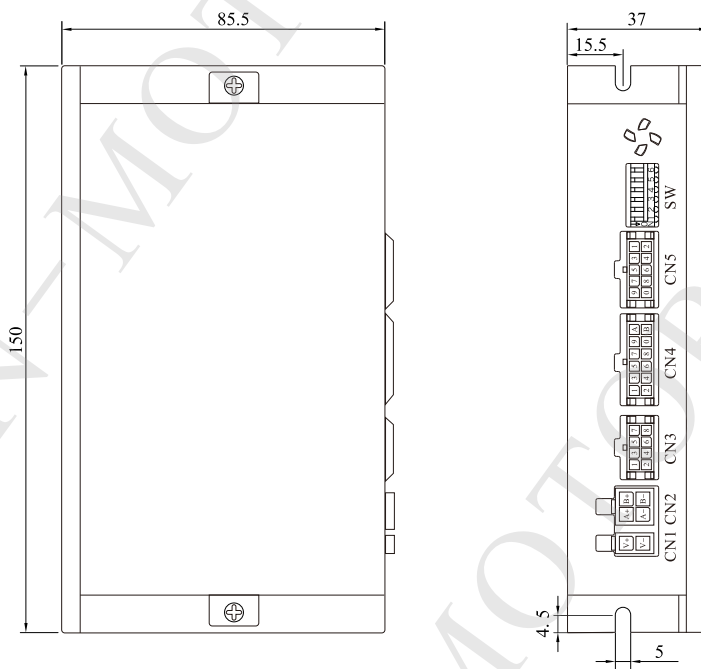
■ Electrical performance and environment indicators

● Electrical Specifications

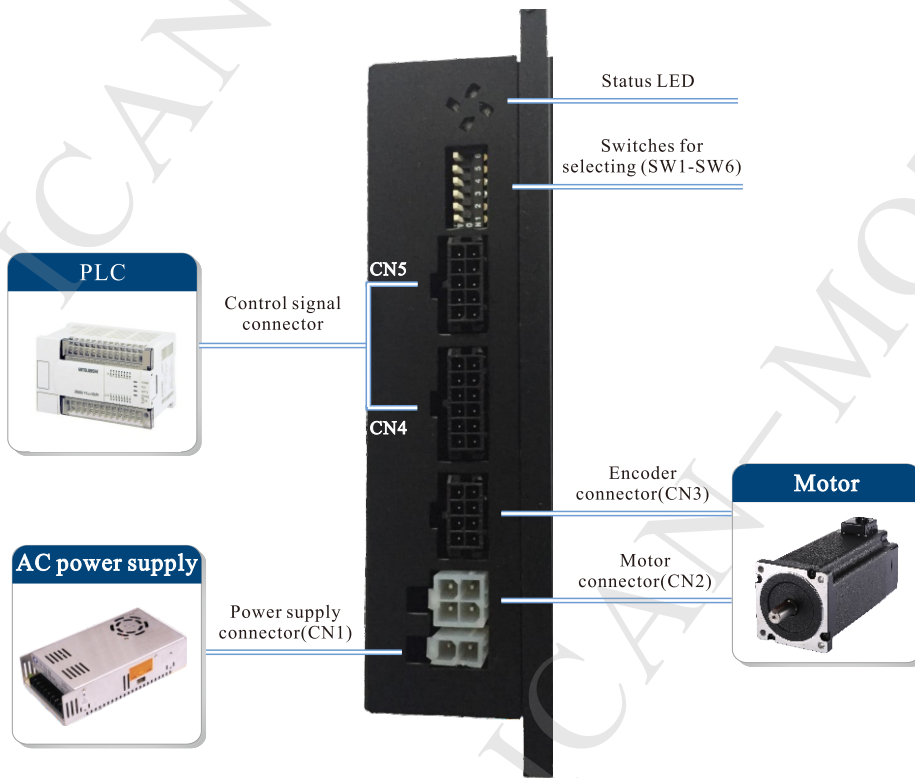| Parameter	Min.	Typical	Max.	Unit
Power supply	20	60	80	VDC
Output Current	1	–	8.0	A
Input pulse frequency	1	–	500K	Hz
Input pulse width	250	–	5E+8	ns
Direction signal width	62.5	–	–	μs
Input signal voltage	3.6	5	24	VDC
Output Signal voltage	-	-	100	mA
Output signal current	-	-	30	vdc

● Environment Indicators

|	
Heat Sinking Method	Natural cooling or fan-forced cooling
Atmosphere	Avoid dust, oily mist and corrosive air
Operating Temperature	−10~40℃
Ambient Humidity	90% or less (non-condensing)
Storage Temperature	−10 ~70℃
Vibration Resistance	5.9m/s² maximum

■ Dimension (Units: mm)

Drive interface and wiring diagram

Status LED

Switches for selecting (SW1-SW6)

CN5

CN4

PLC

Control signal connector

Encoder connector(CN3)

Motor

Motor connector(CN2)

AC power supply

Power supply connector(CN1)

Power supply connector(CN1)

CN1	Input/Output	Function description
V−	Input	Power supply−
V+	Input	Power supply+(AC20-80V)
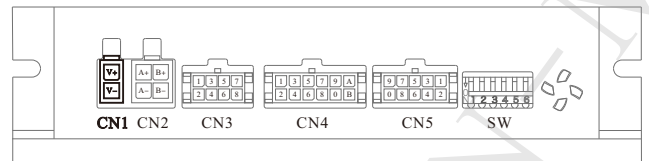
Motor connector(CN2)

CN2	Input/Output	Function description
B−	Input	Motor phase B−
B+	Input	Motor phase B+
A−	Input	Motor phase A−
A+	Input	Motor phase A+
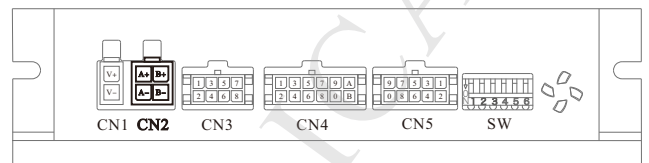
Encoder connector(CN3)

编号	Connector	Input/Output	Function description
1	GND	Output	GND
2	5V	Output	+5V power supply for encoder
3	Z−	Input	Encoder Z−
4	Z+	Input	Encoder Z+
5	B−	Input	Encoder B−
6	B+	Input	Encoder B+
7	A−	Input	Encoder A−
8	A+	Input	Encoder A+
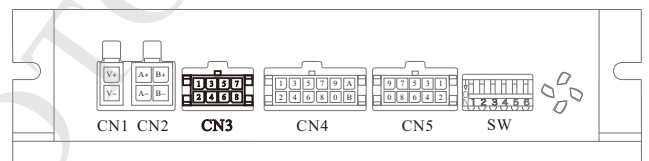
● Control signal connector(CN4)

No.	Connector	Input/Output	Function description
1	OUT Z–	Output	Encoder Z–
2	OUT Z+	Output	Encoder Z+
3	OUT B–	Output	Encoder B–
4	OUT B–	Output	Encoder B+
5	OUT A–	Output	Encoder A–
6	OUT A+	Output	Encoder A+
7	RST–	Input	Alarm reset input –
8	RST+	Input	Alarm reset input +
9	24V-	Input	Electromagnetic brake power supply-
0	24V+	Input	Electromagnetic brake power supply+
A	MB1	Output	Electromagnetic brake output1
B	MB2	Output	Electromagnetic brake output1
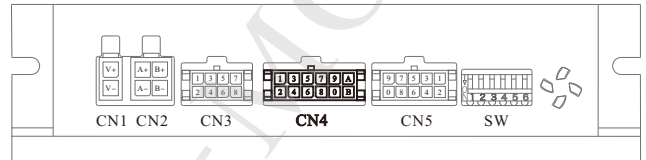
● Control signal connector(CN5)

No.	Connector	Input/Output	Function description
1	PUL–	Input	Pulse Input–/CW Input–
2	PUL+	Input	Pulse Input+/CW Input+
3	DIR–	Input	Direction Input–/CWW Input–
4	DIR+	Input	Direction Input+/CWW Input+
5	ENA–	Input	Enable Input –
6	ENA+	Input	Enable Input +
7	ALM–	Output	Fault Output–
8	ALM+	Output	Fault Output+
9	INPOS-	Output	In position Output–
0	INPOS+	Output	In position Output+
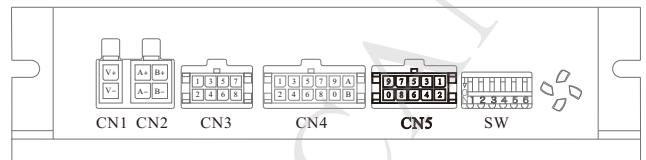
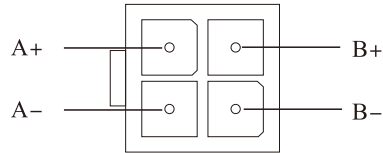● Function selection switches

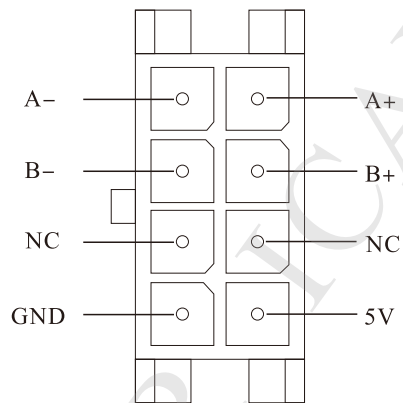| Nama	Function description
SW1~SW4	Micro stepping setting
SW5	Initial direction selection
SW6	Single/double pulse matching
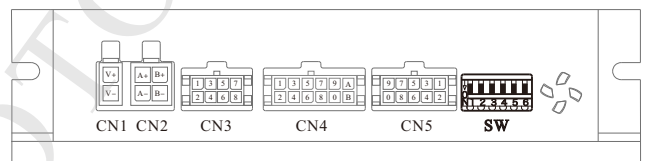
■ Connecting the motor

Closed loop stepper motor has two output cable, one is for motor and another is for encoder.

● Motor cable

```
A+ ─────  ○   ○  ───── B+
A− ─────  ○   ○  ───── B−
```
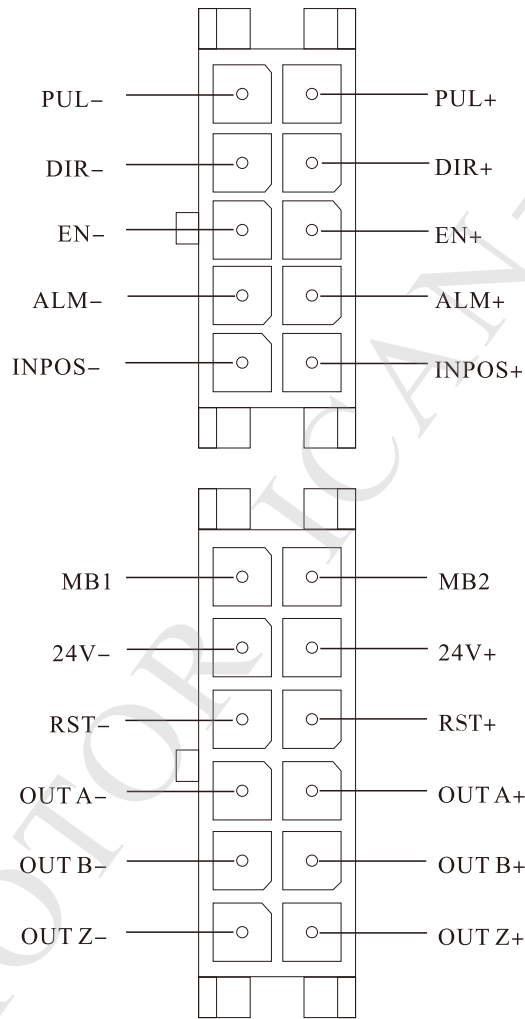
● Encoder cable

```
A− ─────  ○   ○  ───── A+
B− ─────  ○   ○  ───── B+
NC ─────  ○   ○  ───── NC
GND ────  ○   ○  ───── 5V
```

⚠ **Don't tear motor/ encoder cable to damage the motor.**
(For example, taking motor with cable, put heavy things on it)

Description of Input/output Signals

SS86 closed stepper motor driver input/output terminal:

- 6 line optically isolation digital sign input, 5-24V
- 2 line optically isolation digital sign output, 30V/100mA
- Differential signal output(OUT A ± 、OUT B ± 、OUT Z ±)

PUL–   PUL+
DIR–   DIR+
EN–   EN+
ALM–   ALM+
INPOS–   INPOS+

MB1   MB2
24V–   24V+
RST–   RST+
OUT A–   OUT A+
OUT B–   OUT B+
OUT Z–   OUT Z+

Input

Input signal

The signal input is OC input, the voltage is DC5V-24V. The largest frequency of pulse and direction signal is 500KHZ. The pulse rising edge is valid.

Common anode
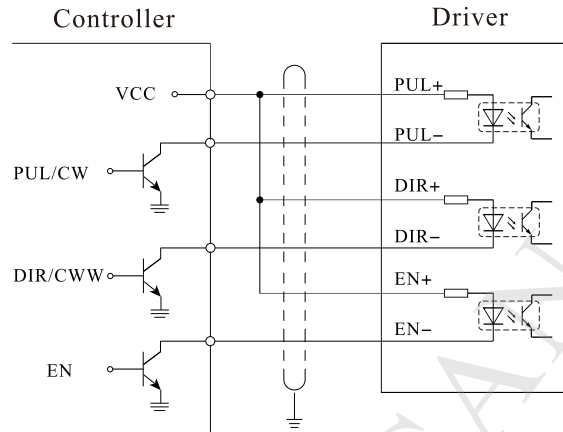
Common cathode
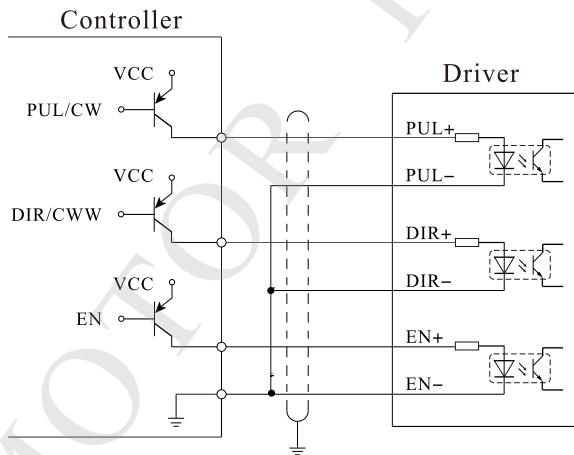
Difference
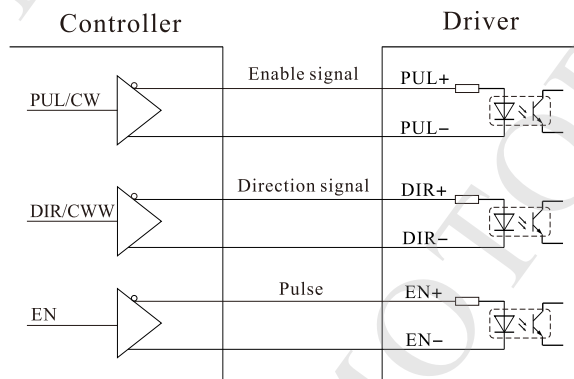
■ Output

● Alarm signal output

Alarm signal is OC. The largest voltage is 30V and the largest current is 100mA

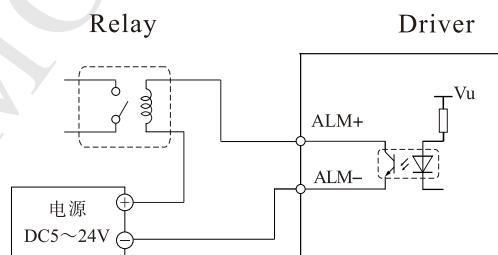⚠ **Notice: Don't connect output with voltage over 30V, 100mA**
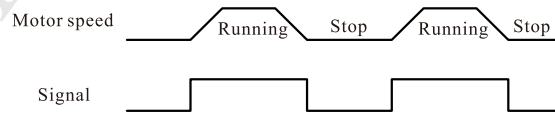
Common anode
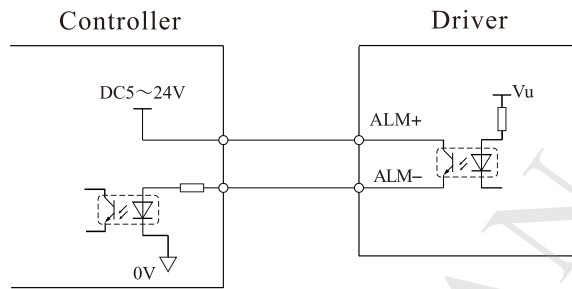
Common cathode
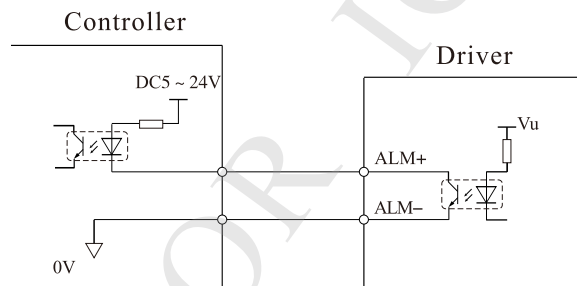
Relay

● Encoder output

SS86 has differential signal output(OUT Z ± 、 OUT A ± 、 OUT B ±), 20mA max.
They are position output.

● In Position Output signal

When the motor is running, the INPOS is high level, when the motor stops, INPOS is low level.

Motor speed

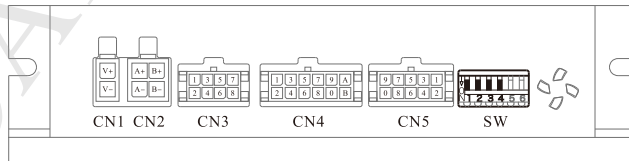Running Stop Running Stop

Signal

● Electromagnetic brake

When electromagnetic brake power connects with MB1 and MB2, motor runs;

When an alarm signal come out from driver, electromagnetic brake disconnects with MB1, MB2, motor stops automatically.

Driver

Power supply
DC24V

+24V

GND

Electromagnetic
brake

B   Varistor

MB1

MB2
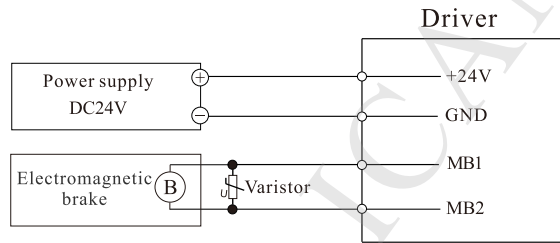
Function setting

● Microstepping

The microstep resolution is set by the SW1, SW2, SW3 and SW4 switches. There are 16 settings.

Subdivision (Step/r)	SW1	SW2	SW3	SW4
200	ON	ON	ON	ON
400	OFF	ON	ON	ON
800	ON	OFF	ON	ON
1600	OFF	OFF	ON	ON
3200	ON	ON	OFF	ON
6400	OFF	ON	OFF	ON
12800	ON	OFF	OFF	ON
25600	OFF	OFF	OFF	ON
1000	ON	ON	ON	OFF
2000	OFF	ON	ON	OFF
4000	ON	OFF	ON	OFF
5000	OFF	OFF	ON	OFF
8000	ON	ON	OFF	OFF
10000	OFF	ON	OFF	OFF
20000	ON	OFF	OFF	OFF
25000	OFF	OFF	OFF	OFF

● Initial direction selection
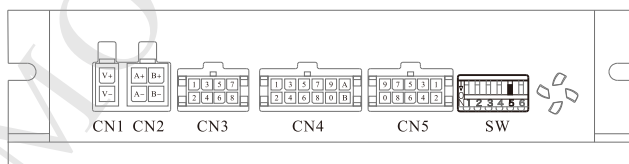
SW5=ON, Motor rotates anticlockwise; SW5=OFF, Motor rotates clockwise (factory setting)
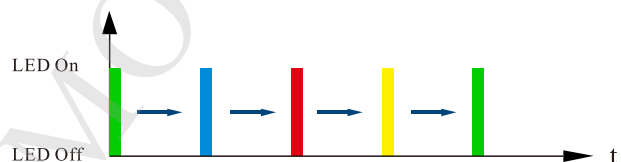
Motor rotates anticlockwise

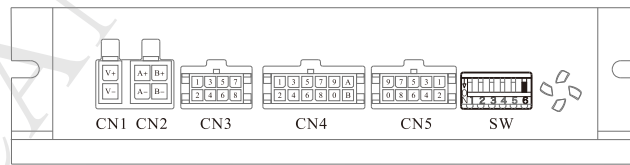When motor rotates anticlockwise, status LED flickers as Green-Yellow-Red-Blue-Green.
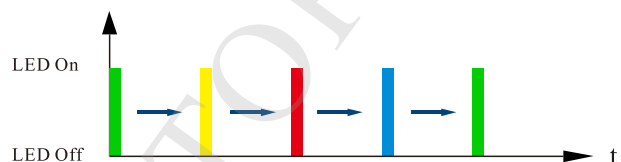
Motor rotates clockwise

When motor rotates clockwise, status LED flickers as Green- Blue-Red-Yellow-Green.
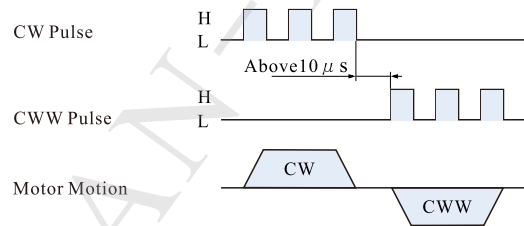
● Pulse&Direction mode selection

CN1 CN2   CN3   CN4   CN5   SW

SW6=OFF, Pulse&Dir Mode; SW6=ON, CW&CCW Mode

⚠ **The setting will take effect after recycle the power**

CW/CCW Pulse

When pulse is input at PUL/CW terminal,
the motor will rotate by one step in one
direction.
When pulse is input at DIR/CWW terminal,
the motor will rotate by one step in the
other direction.

Pulse & Direction

When pulse is input at PUL terminal, and DIR
terminal is high voltage, the motor will rotate by
one step in one direction.
When pulse is input at PUL terminal, and DIR
terminal is low voltage, the motor will rotate by
one step in the other direction.

CW Pulse
CWW Pulse
Motor Motion

PUL input
DIR input
Motor Motion
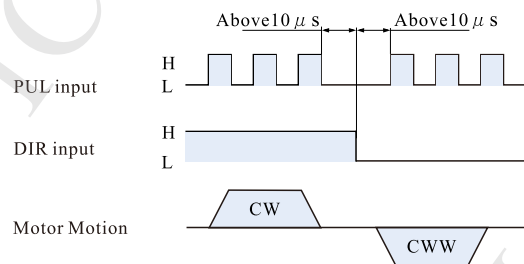
■ LED Error Codes
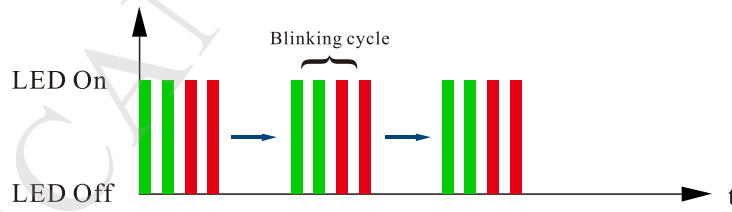
When alarm LED is on, please check the reason as following tab.

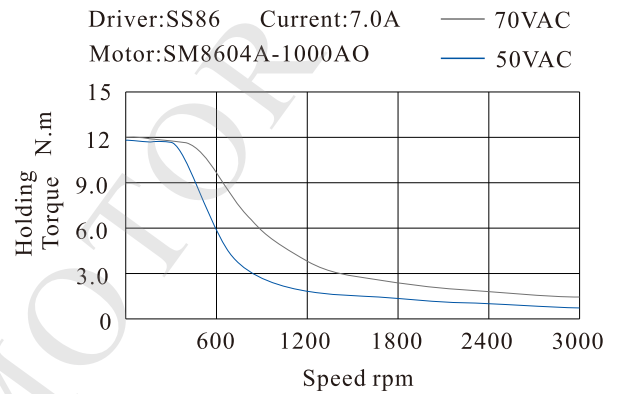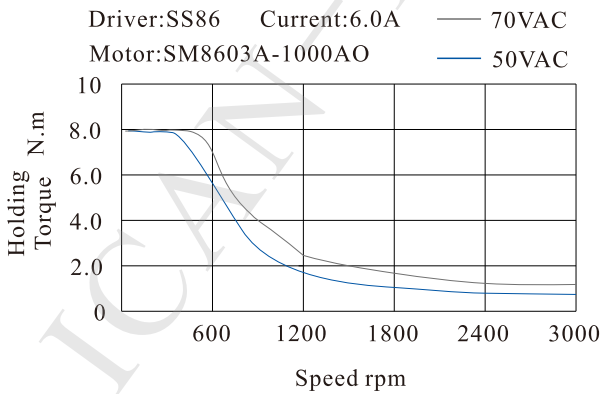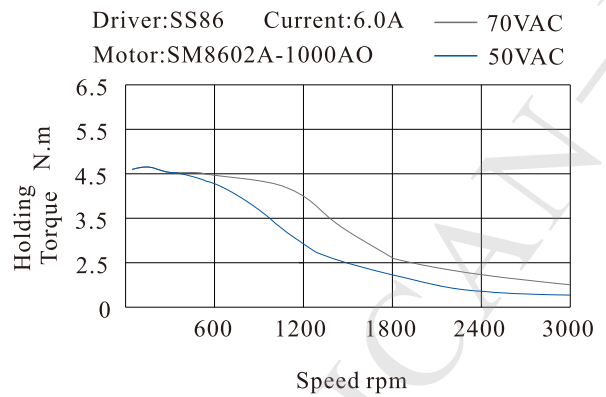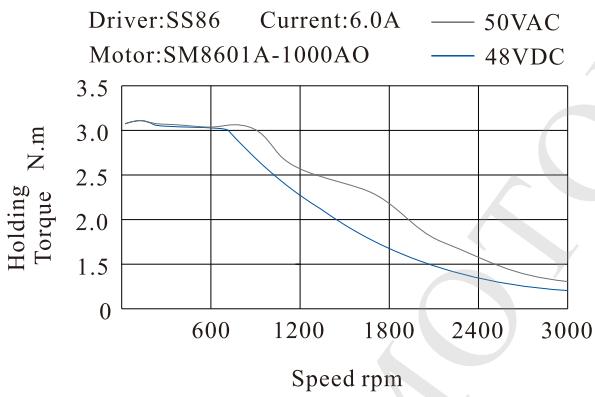| LED	Motion status/Alarm
Green, yellow, red, blue circulation flashing	Motor rotates clockwise normally
Green, blue, red, yellow circulation flashing	Motor rotates anticlockwise normally
2 green, 2red circulation flashing	Over current protection
2 green, 3red circulation flashing	Open circuit protection
2 green, 4red circulation flashing	Over voltage protection
2 green, 5red circulation flashing	Under voltage protection
3 green, 2red circulation flashing	Overload protection
Flashing blue	In position output
Flashing red	Enable status

Notice: Turning on power is banned when driver hasn't been connected with motor, power positive and negative pole will ruin the driver.

■ Recommended motor

● Nema 34 closed loop stepper motor

unit : mm
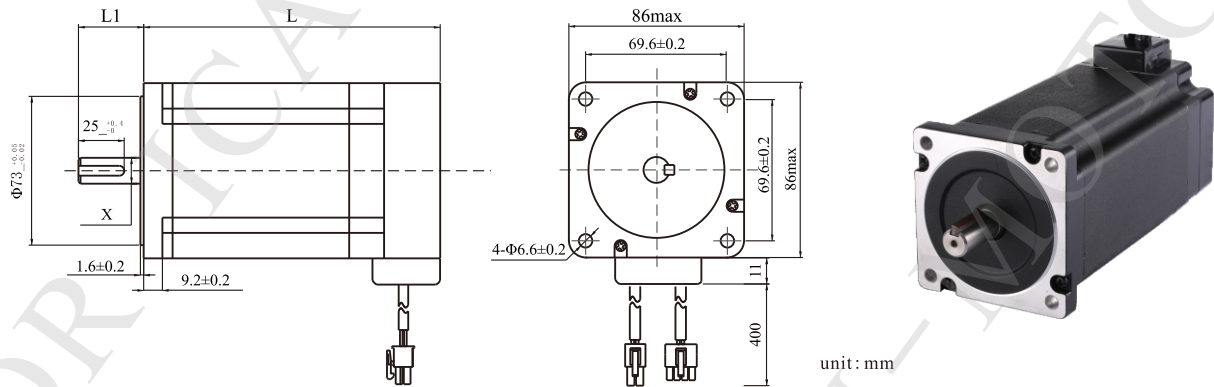
Model	Holding Torque(Nm)	Current/ phase(A)	Resistance (Ω)	Inductance (mH)	Diameter of axle X(mm)	Axial length L1(mm)	Motor Length L(mm)	Encoder Resolution
SM8601A-1000AO	3.4	6.0	0.35	1.7	9.5	30	88	1000
SM8602A-1000AO	4.5	6.0	0.35	3.0	12.7	30	100	1000
SM8603A-1000AO	8.5	6.0	0.42	4.6	14	30	138	1000
SM8604A-1000AO	11	7.0	0.56	6.9	14	30	176	1000

Driver:SS86   Current:6.0A   —— 50VAC
Motor:SM8601A-1000AO   —— 48VDC

Driver:SS86   Current:6.0A   —— 70VAC
Motor:SM8602A-1000AO   —— 50VAC

Driver:SS86   Current:6.0A   —— 70VAC
Motor:SM8603A-1000AO   —— 50VAC

Driver:SS86   Current:7.0A   —— 70VAC
Motor:SM8604A-1000AO   —— 50VAC

■ Accessories

● Naming rule for motor cable

| SW | - | 50 | G | M | 03 |

Series name
SW：SW series

Cable cross section

Cable category
G:Universal cable
F:High soft cable

Cable use
M:Motor cable

Cable length
01:1M
03:3M
05:5M

13
9.8
9.5

Driver side

L

11.7
13.8

Motor side
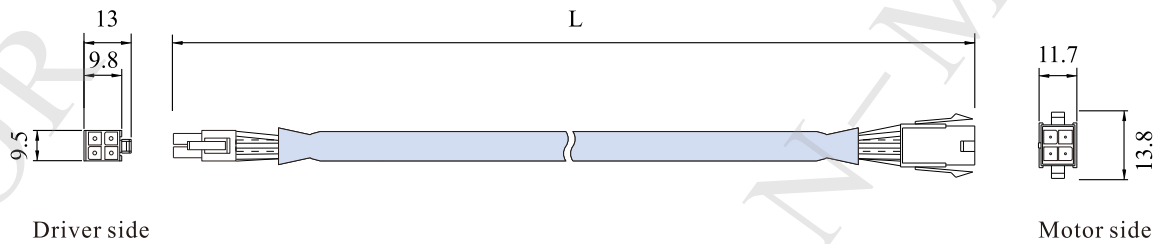
● Naming rule for encoder cable

| SW | - | 14 | F | E | 03 |

Series name
SW：SW series

Cable cross section

Cable category
F:High soft cable

Cable use
E:Encoder cable

Cable length
01:1M
03:3M
05:5M

8.8
6.8
12.8

Driver side

L

8.2
16.8

Motor side
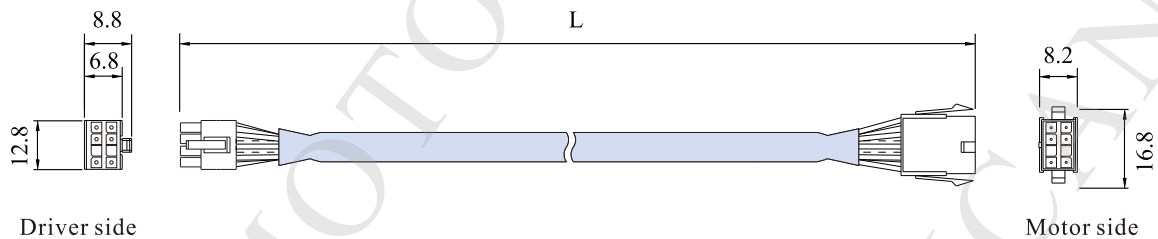
● Cable list

Name	Cable material	Model number		
		Cable 1M	Cable 3M	Cable 5M
Motor cable	General (not resistant to bending)	SW50GM01	SW50GM03	SW50GM05
	High soft (resistant to bending 500W times)	SW50FM01	SW50FM03	SW50FM05
Encoder cable	High soft (resistant to bending 500W times)	SW14FE01	SW14FE03	SW14FE05

⚠ 1. Make sure all the cable terminals are connected well to avoid short circuit and damage the driver
2. Use Shielded Twisted Pair(STP) as encoder and control line to enhance anti-jamming capability.

After sale service

Warranty period

Dongguan ICAN Technology provides warranty for 1 year from the date of shipping.

Maintenance process

1) Get the maintenance permission
2) Ship the package to the following address: 4/F, Block B, RuiLian Zhenxing Industrial Park, Wanjiang District, Dongguan City, Guangdong Province
Tel: 86-0769-22327568

Return policy

1. After use or man-made damage condition (etc, wrong wiring), no return

2. ICAN Technology guarantees the product quality, but product incompatibility is not in the return or maintain condition.
3. Customers don't use the products under the specified electrical performance and environment indicators, no maintain condition

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