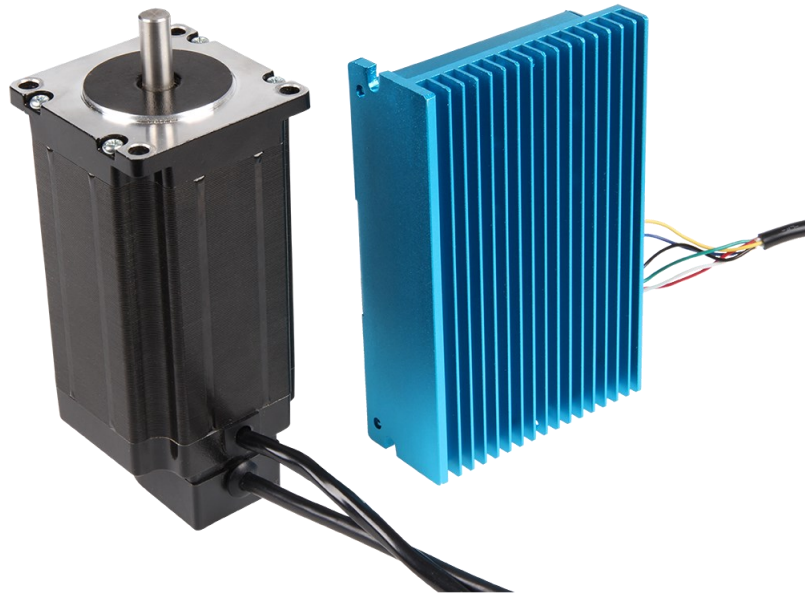


# NEMA CLOSED-LOOP STEP MOTOR

NEMA-23-04CL



## 1. GENERAL INFORMATION

Dear customer,  
Thank you very much for choosing our product. In the following, we will show you what you need to consider during commissioning and use.

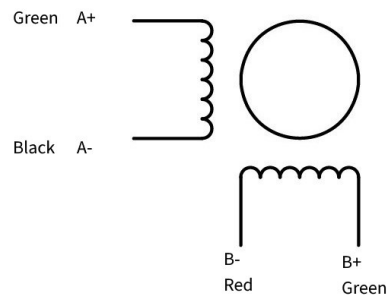
Should you unexpectedly encounter any problems during use, please feel free to contact us.

## 2. CONNECTIONS


2 multi-core cables lead out of the stepper motor.

The 4-core cable belongs to the motor, the cable assignment is as follows:

Connection	Colour
A+	Green
A-	Black
B+	Blue
B-	Red



In addition, an 18 - 70 V DC power supply for the motor must be connected to the motor driver at V+ / V-.

In addition, a protective grounding can be connected to  .

The 6-core cable belongs to the encoder, the cable assignment is as follows

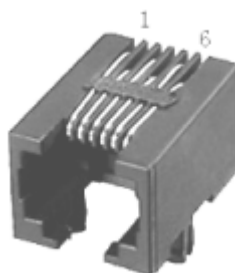
Connection	Colour
EB+	White
EB-	Yellow
EA+	Green
EA-	Blue
VCC	Red
GND	Black

There is another terminal block on the motor driver, this is for the control signal. The connections have the following functions:

Connection		Function	Remarks
PUL+	PUL+ and PUL- are the positive and negative terminals of the control pulse signal.	3,3 V ~24 V	
PUL-			
DIR+	DIR+ and DIR- are the positive and negative terminals of the directional signal.		
DIR-			
ENA+	ENA+ and ENA- the positive and negative terminals of the enable signal.		
ENA-			
ALM+	ALM+ and ALM- are the positive and negative terminals of the alarm output signal.	< 24 V, 40 mA	
ALM-			

The pin assignment of the RS-232 connection is as follows:

Pin	Funktion
1	NC
2	5V
3	TXD
4	GND
5	RXD
6	NC



### 3. DIP-SWITCHES

DIP switches 1 to 4 are used to configure the microsteps of the following dimensions:

Mikrosteps	SW1	SW2	SW3	SW4
3600	ON	ON	ON	ON
800	OFF	ON	ON	ON
1600	ON	OFF	ON	ON
3200	OFF	OFF	ON	ON
6400	ON	ON	OFF	ON
12800	OFF	ON	OFF	ON
25600	ON	OFF	OFF	ON
7200	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
40000	OFF	OFF	OFF	OFF

With the DIP switch 5 (SW5) you can set the direction of rotation of the motor. If the switch is set to ON, it rotates clockwise, if the switch is set to OFF, it rotates counterclockwise.  
The setting is only accepted after a restart of the unit.








DIP switch 6 (SW6) is used to select whether the internal smoothing function for the input pulse signal should be activated. If the switch is set to ON, this means that the smoothing function is enabled, if it is set to OFF, the Function disabled.  
The setting is only accepted after a restart of the unit.

DIP switch 7 (SW7) is used to select the input pulse mode. If the switch is set to ON, the PUL/DIR mode is active, if it is OFF, the CW/CCW mode is active.  
The setting is only accepted after a restart of the unit.

With the DIP-switch 8 (SW8) you can activate or deactivate the step loss detection. If the switch is set to OFF, the step loss detection is activated, if the switch is set to ON, it is deactivated.  
The setting is only applied after the unit has been restarted.

## 4. LED INDICATORS

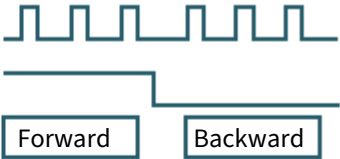
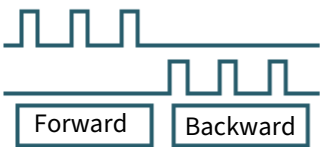
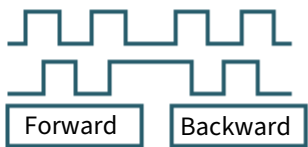
A green and a red LED are installed on the motor driver to indicate the current status.

	LED status	Drive status
	The green LED lights up	Drive not active
	The green LED flashes	Drive operates normally
	The red and green LEDs light up	Overcurrent
	The red LED flashes twice and the green once	Overvoltage
	The red LED flashes three times and the green LED once	Incorrect internal driver voltage
	The red LED flashes four times and the green LED once	Tracking error exceeds the limit value
	The red LED flashes five times and the green LED once	Encoder phase error

## 5. CONTROL SIGNAL CONNECTION

### PUL, DIR port: Connection for pulse command

The standard signal is pulse-shaped.  
The motor driver can receive three types of pulse command signals.

Pulse and direction (PUL + DIR)	
Double pulse (CW + CCW)	
Orthogonal pulse (A/B orthogonaler Impuls)	

### ENA-port: enable/disable

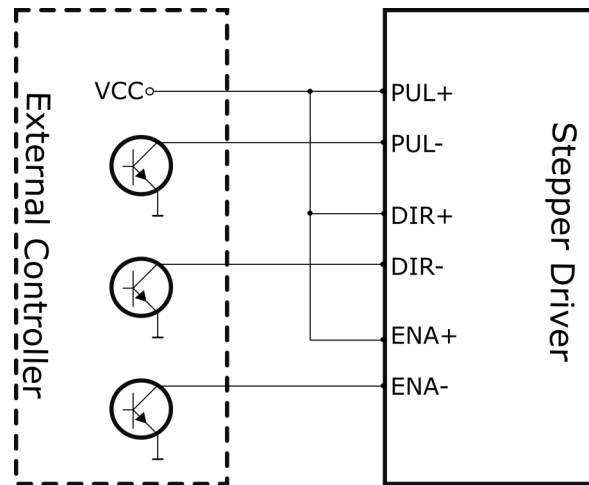
When the standard optocoupler is off, the driver outputs current to the motor. When the internal optocoupler is on, the driver cuts off the current to each phase of the motor, so that the motor is in a free state and cannot react to the step pulse. If the motor is in the wrong state, the connection enables an automatic switch-off. The level logic of the enable signal can also be set in reverse.

### ALM-port: Alarm output

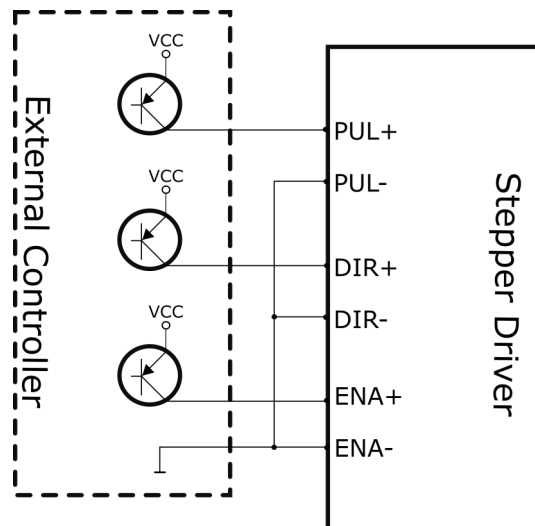
The ALM connector is used to output the driver's operating status to the external control circuit. ALM outputs different optocoupler levels when the driver is in the wrong state and in normal operating state.

## Control signal wiring example

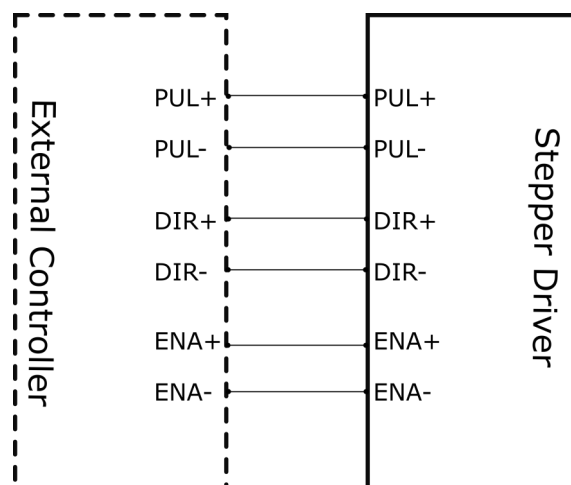
Connection to open-collector signal



Connection to PNP signal



Differential



## 6. PC SOFTWARE

### 6.1 First steps

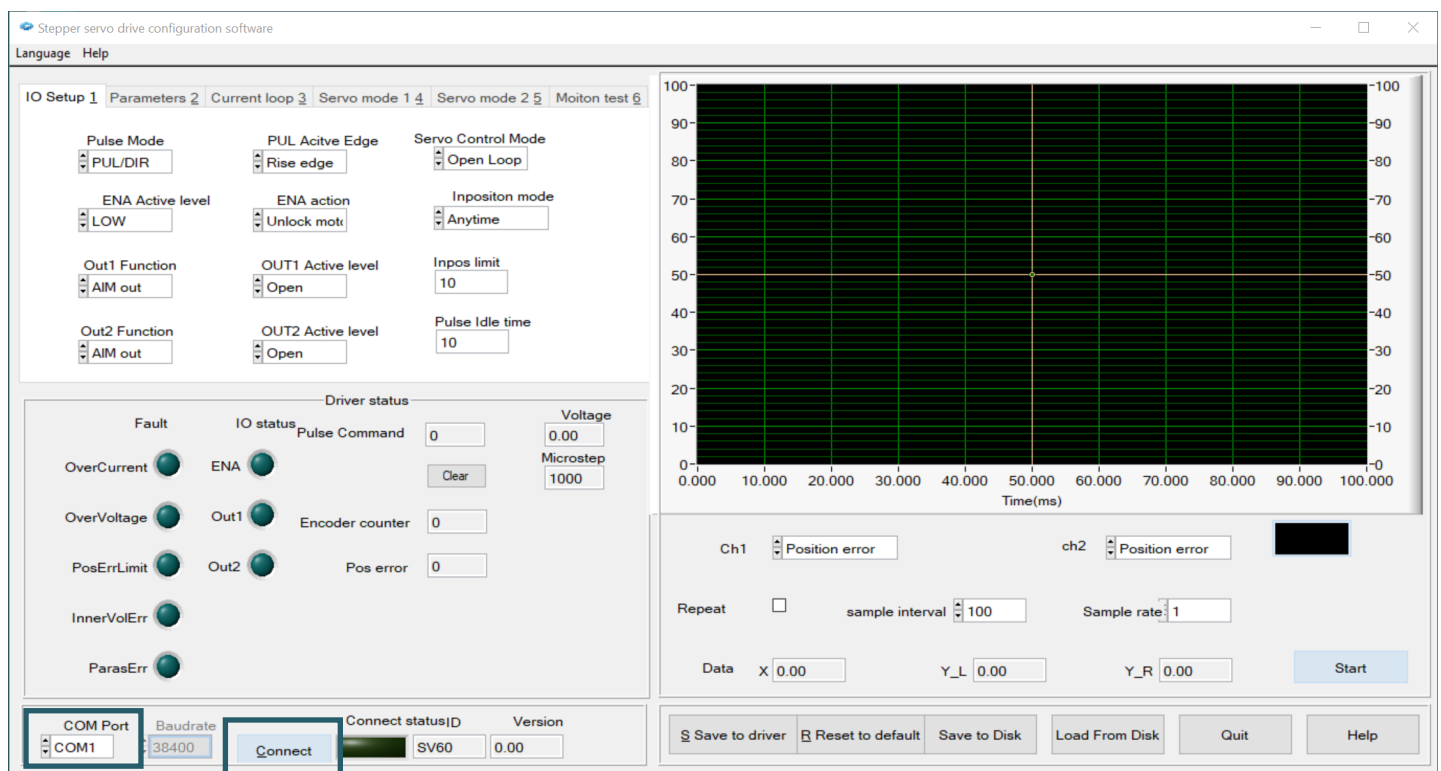
First you need to download the PC software [here](#) and then install it on your computer.

To control your motor driver with the PC software, you need an appropriate RJ-11 to SUB-D 9 connection cable.

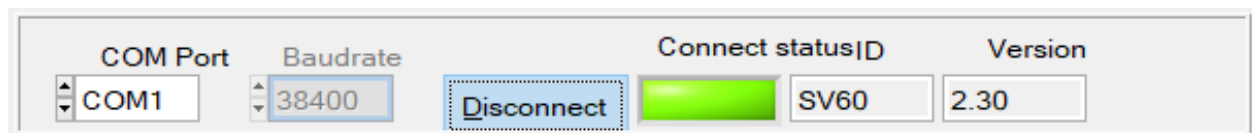
When selecting the cable, pay attention to the correct pin assignment. You must connect the RJ-11 plug to your motor driver and the SUB-D plug to a COM port on your PC.

Now you can start the PC software.

Now select the COM port to which the driver is connected and press Connect.



When the connection has been successfully established, the status indicator lights up green. This should look like this.



## 6.2 Driver status

Driver status

Fault

OverCurrent 1

OverVoltage 2

PosErrLimit 3

InnerVolErr 4

ParasErr 5

IO status

ENA 6

Out1 7

Out2 8

Pulse Command

0 9

Clear 10

Encoder counter 0 11

Pos error 0 12

Voltage

0.00 13

Microstep

1000 14

Number	Function
1	Lights up in case of overcurrent
2	Lights up in case of overvoltage
3	Lights up when the position error limit has been exceeded
4	Lights up in the event of an internal voltage error
5	Lights up in the event of a parameter error
6	Lights up when driver is activated
7	Lights up when output signal 1 of the motor driver is active.
8	Lights up when output signal 2 of the motor driver is active.
9	Indicates the number of pulses
10	Press to reset
11	Indicates the number of encoder steps
12	Indicates the current number of position errors
13	Indicates the current voltage
14	Indicates the current microsteps



## 6.3 IO Setup

IO Setup 1 Parameters 2 Current loop 3 Servo mode 1 4 Servo mode 2 5 Motion test 6

1

Pulse Mode

PUL/DIR

2

ENA Active level

LOW

3

Out1 Function

AIM out

4

Out2 Function

AIM out

5

PUL Active Edge

Rise edge

6

ENA action

Unlock motor

7

OUT1 Active level

Open

8

OUT2 Active level

Open

9

Servo Control Mode

Open Loop

10

Inposition mode

Anytime

11

Inpos limit

10

12

Pulse Idle time

10

Number	Function
1	Setting the pulse mode
2	Setting the Active Level of the Enable Pin
3	Setting the function for output1 of the motor driver
4	Setting the function for output2 of the motor driver
5	Setting the active PUL edge
6	Setting the Enable Action
7	Setting the active OUT1 edge
8	Setting the active OUT2 edge
9	Setting the servo control mode
10	Setting the input mode
11	Setting the inpos limit
12	Setting the pulse idle time

## 6.4 Parameter

IO Setup 1 Parameters 2 Current loop 3 Servo mode 1 4 Servo mode 2 5 Moiton test 6

1 Max Current 100

2 Base Current 50

3 Initial Lock time 1000

4 Default Microstep 200

5 Encode Resolution 4000

6 PE AIM 4000

7 Pulse noise filter 5

8 Pulse Smooth 128

Filter settings

9 FV1(HZ) 200

10 FV2(HZ) 600

11 FA(HZ) 1000

12 FPOUT(HZ) 1000

Number	Function
1	Setting the maximum current
2	Setting the base current
3	Setting the Initial Locking Time
4	Setting the standard microsteps
5	Setting the encoder resolution
6	Setting the permissible step losses
7	Adjusting the impulse noise filter
8	Setting the pulse smoothing
9	Speed feedback filter1
10	Speed feedback filter2
11	Acceleration feedback filter
12	Frequency of the output pulse signal

## 6.5 Current control loop

IO Setup 1
Parameters 2
Current loop 3
Servo mode 1 4
Servo mode 2 5
Moiton test 6

1
☐ AutoPI

2
I\_Kp
1000

3
I\_Ki
100

4
I\_Kc
256

7
Auto Resistance
1000

8
Auto inductance
1000

6
Step test

9
User set Resistance
1000

10
User set inductance
1

11
Torque constant
1000

5
I\_Step test current
1000

Number	Function
1	Activate / deactivate the proportional-integral regulator
2	Proportional gain PI regulator
3	Integral gain PI regulator
4	Gain PI regulator
5	Setting the current for the step test
6	Perform a step test
7	Shows the phase resistance in mΩ
8	Shows the phase inductance in mH
9	Setting the resistance
10	Setting the induction
11	Adjusting the torque

6.6 Servo Mode 1

IO Setup 1Parameters 2Current loop 3Servo mode 1 4Servo mode 2 5Moiton test 6

S1\_Kp

12000

S1\_Ki

20

S1\_Kv

3200

S1\_Kvff

430

Kdi

50

Number	Function
1	Setting the Proportional Gain
2	Setting the integral gain
3	Damping factor
4	Setting the speed feedback
5	Setting the damping

## 6.7 Servo Mode 2

IO Setup 1 Parameters 2 Current loop 3 Servo mode 1 4 Servo mode 2 5 Moiton test 6

S2\_Kp

1 2000

S2\_Ki

2 1000

Gravity compensation

3 0

S2\_KV1

4 0

S2\_K2

5 800

S2\_KVFF

6 600

S2\_KAFF

7 0

Number	Function
1	Setting the proportional gain
2	Setting the integral gain
3	Setting the gravity compensation
4	Speed feedback 1
5	Speed feedback 2
6	Speed Forward Gain
7	Acceleration Forward Gain

## 6.8 Motion test

IO Setup 1

Parameters 2

Current loop 3

Servo mode 1 4

Servo mode 2 5

Moiton test 6

1

Speed(Hz)

60

2

Acceleration(P/s^2)

0

3

Distance(Pulse)

0

4

Interval

10

5

JOG - <---

6

JOG + --->

7

Move - <---

8

Move + --->

9

Start

Number	Function
1	Setting the speed
2	Setting the acceleration
3	Setting the distance
4	Setting the delay between repetitions
5	Press and hold to move backwards
6	Press and hold to move forward
7	Press to move the set distance backwards
8	Press to move the set distance forward
9	Press to start the test mode with the set parameters

## 6.9 Diagram display

1 Ch1

2 ch2

3 Repeat ☐

4 sample interval

5 Sample rate

6 Data X

7 Y\_L

8 Y\_R

9

Number	Function
1	Setting the CH1 graph
2	Setting the CH2 graph
3	Enable/disable the repeat function
4	Setting the sampling interval
5	Setting the sampling rate
6	Indicates position of the cursor on the X-axis
7	Indicates position of the cursor on the left Y-axis
8	Indicates position of the cursor on the right Y-axis
9	Start or stop the diagram display

## 6. ADDITIONAL INFORMATION

Our information and take-back obligations according to the Electrical and Electronic Equipment Act (ElektroG)



### Symbol on electrical and electronic equipment:

This crossed-out dustbin means that electrical and electronic appliances do not belong in the household waste. You must return the old appliances to a collection point.

Before handing over waste batteries and accumulators that are not enclosed by waste equipment must be separated from it.

### Return options:

As an end user, you can return your old device (which essentially fulfils the same function as the new device purchased from us) free of charge for disposal when you purchase a new device.

Small appliances with no external dimensions greater than 25 cm can be disposed of in normal household quantities independently of the purchase of a new appliance.

### Possibility of return at our company location during opening hours:

SIMAC Electronics GmbH, Pascalstr. 8, D-47506 Neukirchen-Vluyn, Germany

### Possibility of return in your area:

We will send you a parcel stamp with which you can return the device to us free of charge. Please contact us by email at [Service@joy-it.net](mailto:Service@joy-it.net) or by telephone.

### Information on packaging:

If you do not have suitable packaging material or do not wish to use your own, please contact us and we will send you suitable packaging.

## 7. SUPPORT

If there are still any issues pending or problems arising after your purchase, we will support you by e-mail, telephone and with our ticket support system.

Email: [service@joy-it.net](mailto:service@joy-it.net)

Ticket system: <https://support.joy-it.net>

Telephone: +49 (0)2845 9360-50

For further information please visit our website:

[www.joy-it.net](http://www.joy-it.net)