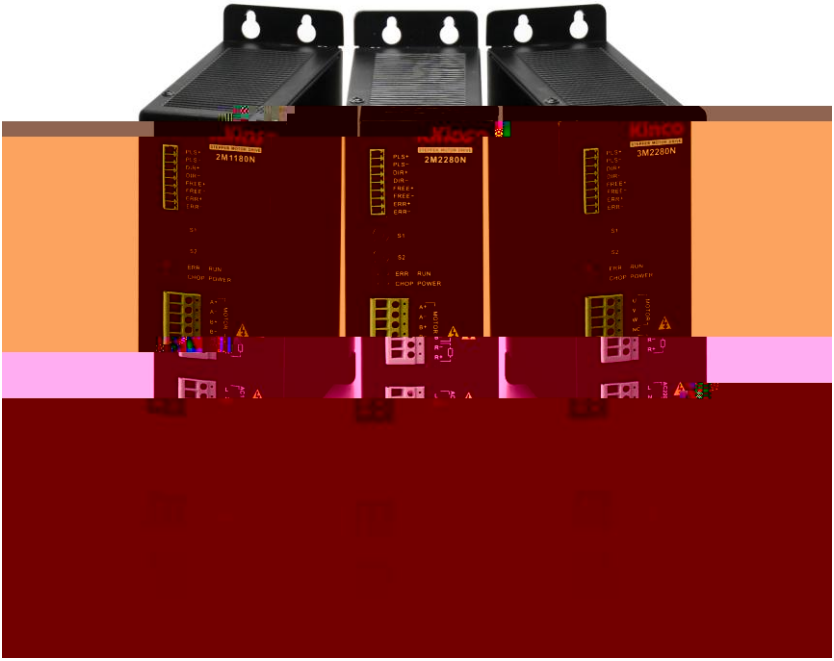
V1.2



Kinco 深圳市步科电气有限公司
Kinco Electric(Shen

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2.1 ……3
2.2 ……3
2.3 ……3
2.4 ……3
2.5 ……4
2.6 ……4
……5.
3.1 ……5
3.2 ……5
3.3 ……7
3.4 ……8
3.5 ……9
3.6 ……11
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4.1 ……12
4.2 ……12

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3M2280N
V1.2
2013 11 08

V1.0	2010-8-5	
V1.1	2011-10-13	
V1.2	2013-11-08	

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-
- 3M2280N 310VDC 60
-
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  1.25
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2.1

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3M2280N	1
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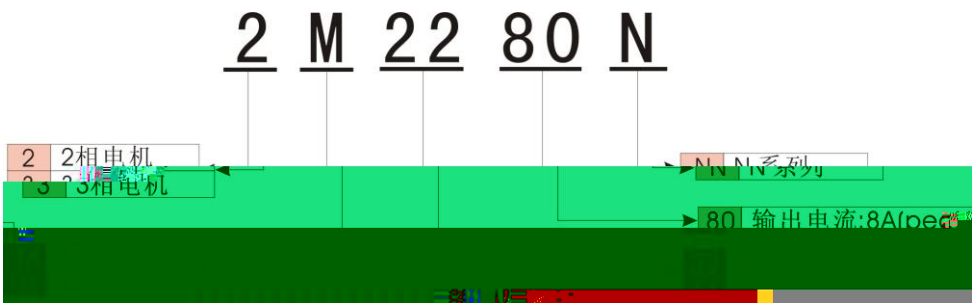
2k	3
10mm 10	3
15mm 12	3

2.2



2.3

N DSP

2.4

-
- 3M2280N 187V 253V 220V
-
-
-
- /
- ERR
- 1.5S

- 400KHZ
- 14 .
-
-

2.5

3M2280N DSP

-

-

- 1.5

3.1

1

3.3

-
- R0 24VDC
  2K 12VDC

3.4

⚠

- 400KHz
-
-

1ms

⚠

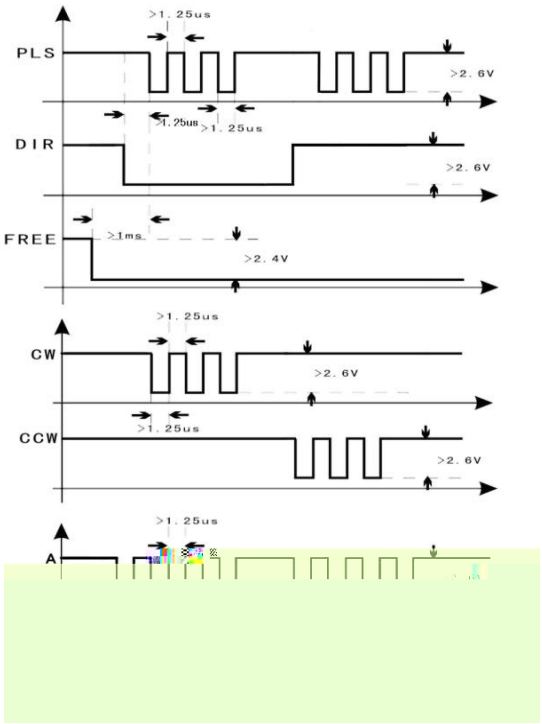
-

10

-
-

1.5mm²

-



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10mm

-

3.5

S1 S2

/

S1 Micro-step

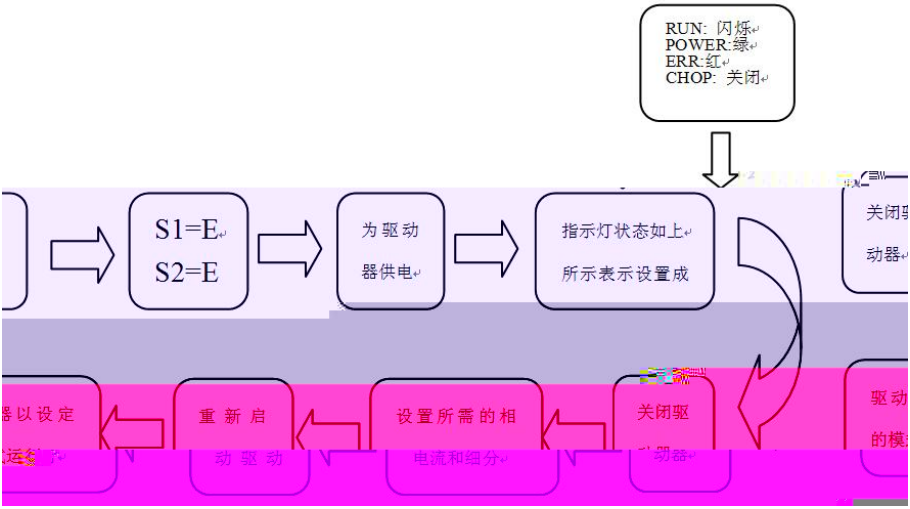
S1	0	1	2	3	4	5	6	7
Pulse/rev	400	500	600	800	1000	1200	1500	2000
S1	8	9	A	B	C	D	E	F
Pulse/rev	3000	4000	5000	6000	10000	20000	SET1	SET2

S2 Current

S2	0	1	2	3	4	5	6	7
Peak(A)	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60
Rms(A)	1.98	2.26	2.55	2.83	3.11	3.39	3.68	3.96
S2	8	9	A	B	C	D	E	F
Peak(A)	6.00	6.40	6.80	7.20	7.60	8.00	M1	M2
Rms(A)	4.24	4.53	4.81	5.09	5.37	5.66		

	S1	S2	
	F	0~D	S1 F S2 0 D 60RPM
PLS+DIR	E	E	S1 S2
CW/CCW	E	F	, RUN
	E	C	POWER ERR CHOP
	E	D	
	F	F	.

2.


RUN: 闪烁
POWER:绿
ERR:红
CHOP: 关闭
S1=E
S2=E
为驱动器供电
指示灯状态如上所示表示设置成
关闭驱动器
驱动的模
关闭驱
设置所需的相
电流和细分
重新启
动驱动
以设定

-
-
- PLS+DIR
-
-

4.1

N

	Power	Run	Error	Chop	

- 0.5Hz 5Hz
-
-
- ERR
-

4.2

1 ?

130 80-90

2

P= / 3-

3

A.
B.
C.

方

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6 518057

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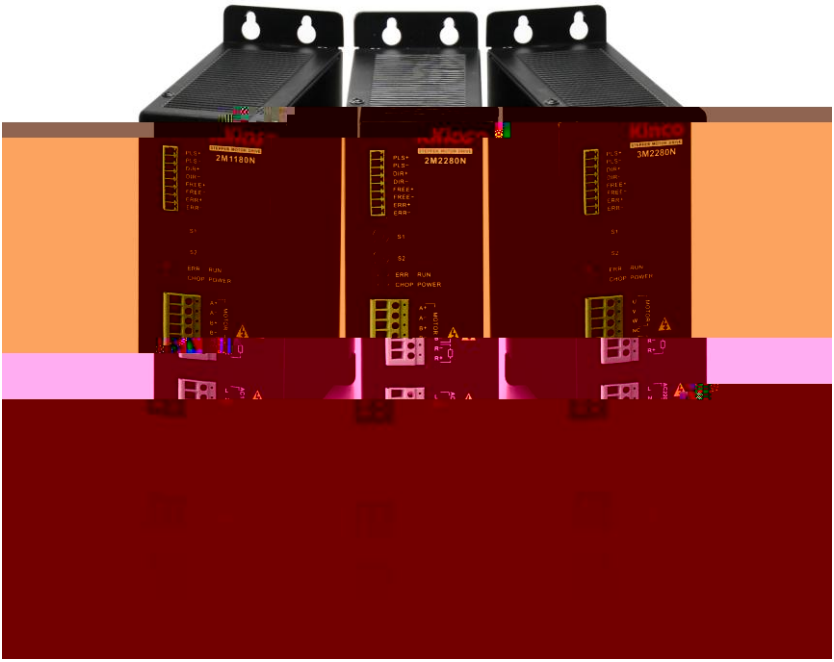
Kinco® N Series Stepper Motor Driver

3M2280N

User Manual

Version: V1.0



Kinco Electric（Shenzhen）Ltd.

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Release Notes on N Series Multi-functional Micro-step Stepper Motor Driver User Manual

Products involved: 3M2280N stepper motor drivers.
Version: V1.2
Date: Nov. 08. 2013

Revision History		
Version	**Date**	**Description**
V1.0	2010-5-20	
V1.1	2011-10-13	
V1.2	2013-11-08	Use new factory address

Chapter 1 Safety Precautions

For the sake of personal safety and avoidance of property loss, please read these safety precautions carefully before test running and use of the driver.

Chapter 2 Product Overview

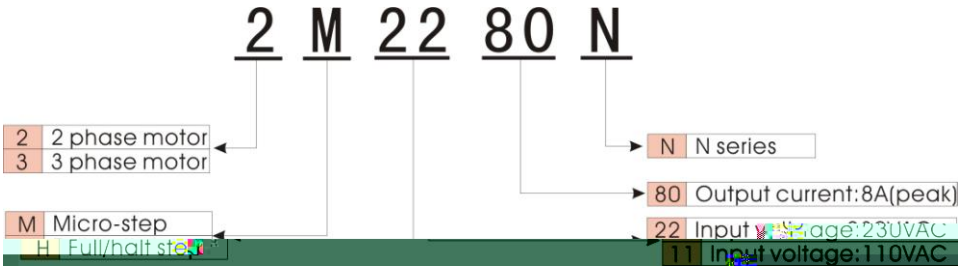
2.1 Product Acceptance

Upon receiving the product, please check the following items:

- Make sure the driver model is consistent with that ordered.
- Unpack the product and make sure it is free from damage and no part is missing.
- Make sure all set screws in the driver are securely tightened.
- Check the received product against the packing list and contact our customer service center in time if any part is missing.

Packing List	
Article	**Qty.**
3M2280N stepper motor drive	1 pcs
Product Service Directory	1 pcs
User Manual	1 pcs
resistors	3 pcs
Length 10mm diameter insulated terminals	3 pcs
Length 15mm diameter insulated terminals	3 pcs

2.2 Product Model Description



2.3 Product Features

- High performance, low cost, and diversified functions
- Automatic parameter adjustable regulation
- Driver test running function
- Phase memory function
- PLS+DIR and CW/CCW control signal available.
- Optocoupler isolation I/O. There is an ERR signal output.
- Opto-isolation signal input, with pulse response frequency up to 400 KHz
- 12 micro-step value, the maximum micro-step value is 128
- With the protection function of over-voltage, under-voltage, over-current, overheat
- With micro-step smoothing filter, the input pulse can be dynamically smooth and reduce the transient motor sport, motor run more smoothly..

2.4 Product Functions Describetion

3M2280N stepper motor drivers adopt DSP single-chip microcomputer as its control core, which greatly enriches their applications. Meanwhile, the intelligent firmware design frees the users from complicated function setting steps and delivers the optimum performance of the motors easily.

- **Motor auto adaptation:** The driver can automatically detect the electrical parameters (e.g., inductance and resistance) of the motor connected with the driver, trace the status of motor in real time, and automatically adjust the driver parameters settings according to the detected motor status to deliver the optimum driving performance. If it is not the first time for the driver to drive the motor, please run the driver under no load before connecting the motor. Then, the driver will clear the motor parameters which stored before. Turn off the power, connect the motor, and turn on the power again; the driver will automatically detect the optimum drive parameters for the current motor.
- **Phase memory:** The driver will keep the phase of the motor in the case of power failure with the motor. Therefore, it prevents the error caused by motor jitter upon power-on on some application occasions. The kept phase will be lost if the motor is replaced or the motor still rotates after the driver stops.
- **Half current function:** If the half current setting is effective. After the motor stops rotation and locks tight, the driver will reduce the phase current of the motor by a half in 1.5 seconds. Strongly recommended to use this function!!!
- **Test running:** If the driver is set to this status, it will automatically drive the motor at a speed of 60RPM. At this time, the output current is the set value and the subdivision setting becomes invalid. This function is used to check whether the driver status is normal.
- **PLS+DIR and CW/CCW compatible input:** The control signal input port of the driver

- **Over-voltage alarm:** The driver will generate a high-voltage alarm if the internal bus voltage exceeds 395 VDC. At this time, turn off the power supply in time and reboot the driver to clear the alarm. If the over-voltage alarm occurs frequently, it is recommended that the input voltage be tuned down or a driver with absorption function be adopted.
- **Short circuit alarm:** The driver will activate the short circuit protection function in the case of short-circuit or wrong wiring of the motor or driver, so as to prevent the damage to the driver. In this case, turn off the power supply in time and check the wiring of the motor. To clear the alarm, reboot the driver.
- **Under-voltage alarm:** The driver will generate a low-voltage alarm if the internal bus voltage goes below 200 VDC in the case of the 2M2280N driver or 90VDC in the case

of the 2M1180N driver. To clear the alarm, reboot the driver.

- **Overheat alarm:** The driver will generate a overheat alarm if the internal temperature reaches 75 .
- **Miss-connection protection:** The driver will generate a miss-connect alarm if the wiring between the driver and the motor is wrong. To clear the alarm, reconnect the wires correctly.

2.5 Scope of Application

The drivers are applicable to various large and medium automation equipment and instruments, including engraving machines, labeling machines, cutting machines, numerical control machine tools, and plotters. They are ideal choices for users in search of low vibration, low noise and high accuracy.

To achieve the optimum performance, KINCO 110 and 130 series stepper motors are recommended.

Chapter 3 Product Parameters and Installation

3.1 Product Parameters

Please learn carefully the driver parameters before use. Make sure the power supply an operating environment conform to relevant requirements.

Table 1 Electrical Specifications

Parameter	Description
Input voltage	3M2280N: Single-phase 220V AC +/-15% (50Hz)(187VAC~253VAC)
Phase current(peak, unit: A)	2.8, 3.2, 3.6, 4.0, 4.4, 4.8, 5.2, 5.6, 6, 6.4, 6.8, 7.2, 7.6 8.0
Micro step(unit: pulse/rev)	400, 500, 600, 800, 1000, 1200, 1500, 2000, 3000, 4000, 5000, 6000, 10000, 20000
Input signal	Three control signal ports: PLS(CW)/DIR(CCW)/FRE; current range: 6 ~16 mA
Control signal input method	PLS+DIR; CW/CCW
Output signal	ERR, open collector output, max current: 10 mA.
Protection	Over-voltage, under-voltage, short circuit, and overheat protection
Absorbing circuit*	Need customize, used to absorb the energy feed back by the motor

Table 2 Operating Environment

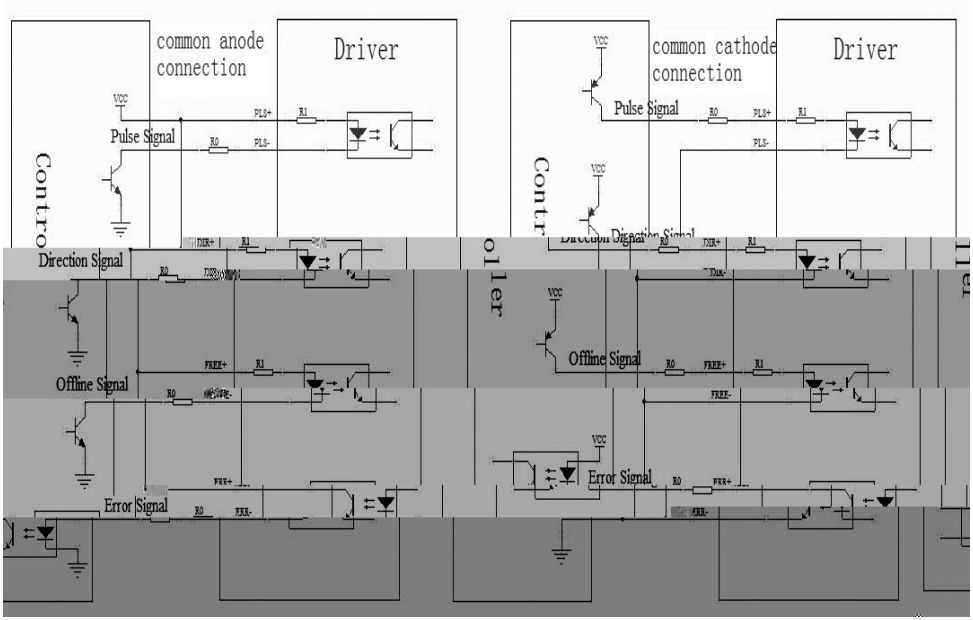
Cooling method		Forced air cooling
Environment	Operation environment	Avoid the environment with great amount of metallic powder, oil mist, or erosive gases.
	Operation humidity	<85%, RH (non-condensing or water drops)
	Operation temperature	0°C ~ +40°C
	Storage temperature	-20°C ~ +70°C
Weight (net)		1.5Kg
Dimensions		201mm×147mm×66mm

Table 3 Definition of Control Signal Port

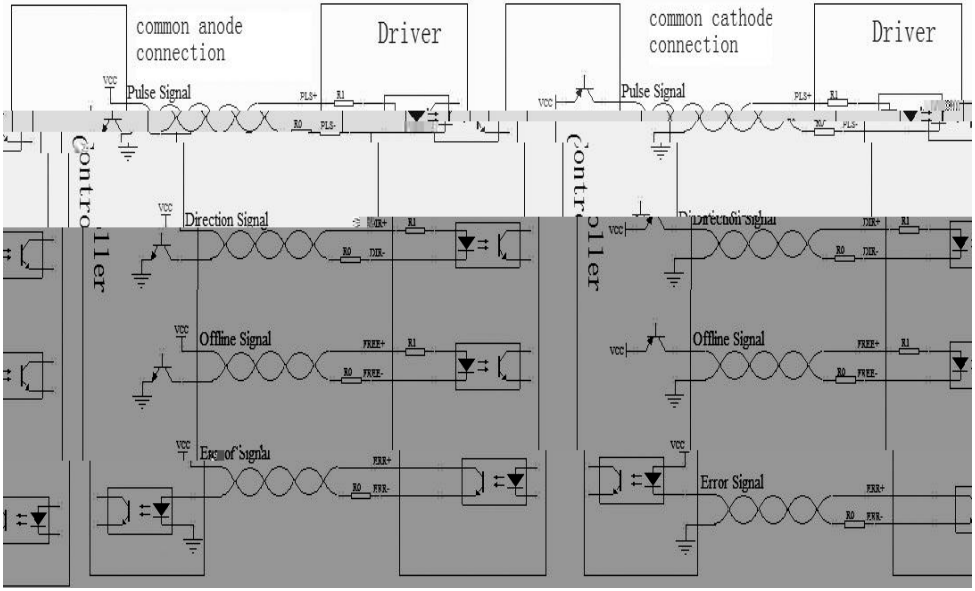
Signal	Functional Description
PLS+(CW+)	Pulse signal. In the PLS+DIR control signal mode, the signal is the pulse control signal and the rising edge is effective. In the CW/CCW control signal mode, the signal is the forward rotation control signal and the rising edge is effective. The high-level time shall not be less than 1.25uS to ensure reliable response of the internal optocoupler. The maximum input frequency of the pulse signal is 400 KHz
PLS-(CW-)	
DIR+(CCW+)	In the PLS+DIR control signal mode, the signal is direction control signal, and the driver sets the rotation direction of the motor by detecting the level of this signal. The signal value of the effective moment in the rising edge of pulse signal. In the CW/CCW control signal mode, the signal is the reverse rotation control signal and the rising edge is effective. To ensure reliable response of the internal optocoupler, the high-level time in this mode

3.3 Wiring Diagram

General Way Control Signal Wiring Diagram



Twisted-pair Way Control Signal Wiring Diagram



- The input circuits of all control signals of the driver have been reliably isolated through
- optocoupler elements, which minimize the interference from external electrical noises.
- In the figure, R0 is an external current limit resistor used to curb the input signal current of the driver. When control signal is at 24VDC, a 2K resistor can be connected; when the control signal is at 12VDC, a 1K resistor can be connected. The current at the input port of the driver must be within 6~16 mA; otherwise, it may cause damage to the equipment.
- ERR signal is open collector output and requires an external power supply. The maximum external voltage cannot exceed 30V. Never connect the ERR signal port in reversed polarity; otherwise, it may cause damage to the port.
- If driver work in a strong interference field,the control signal wiring is recommended twisted-pair way,this can reduce the interference signal source interfere control signal.

3.4 Time Sequence Diagram of Control Signal

⚠ Precautions on Control Signal:

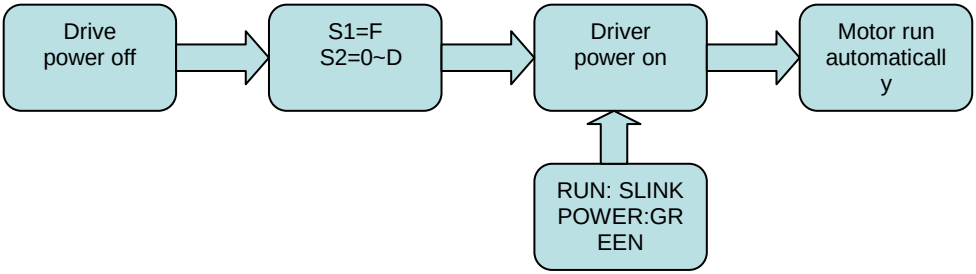
1. The maximum frequency of the input pulse is 400 KHz.
2. Disable direction signal change during pulse signal rise time.
3. A free signal shall be set up 1ms earlier than a pulse signal.

⚠ Precautions on Wiring:

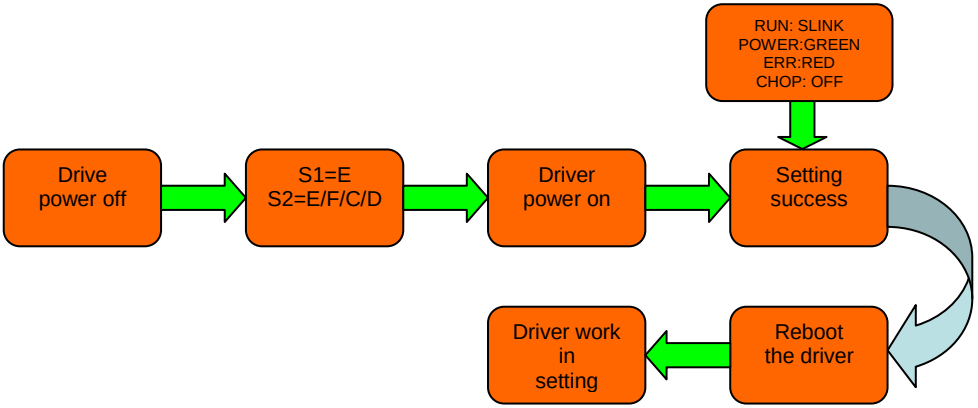
1. To avoid interference on the driver, the strong current cables (phase wires and power cables of the driver) shall be isolated from the weak current cables (for a distance of at least 10cm) when connecting wires for the driver.
2. It is recommended that the

Setting flow chart:

1. Auto Run setting flow



2. Function setting flow



3.6 Installation of the Driver

Mechanical Dimensions

⚠ **Precautions on Installation:**

- It is recommended that the driver be mounted on a side and kept in an upright position, so as to maintain a well ventilated installation environment. Never block or cover the air vents of the driver; otherwise, the normal use of the driver may be prevented by possible frequent overheat alarms.
- For better heat dissipation, two drivers shall be installed at a clearance of at least 50mm.

1. With an ingress protection class of IP20, the driver shall be installed in an industry-compliant indoor switching cabinet; failure to do so may cause damage to the driver or personal injury.

- Enhanced heat dissipation is required if the driver generates overheat alarms frequently. A fan may be installed in a position close to the driver for forced cooling and heat dissipation, so as to ensure the driver works in an allowabl temperature range.

Chapter 4 FAQ

4.1 Indications of Driver Indicators

N series stepper motor drivers are equipped with complete protection circuits to protect their safety to the greatest extent possible. In addition, the rich indications of indicators help the user to learn the working status of the driver in time.

Indications of Indicators:

Alarm	Indicator				Motor Status
	Power	Run	Error	Chop	
Internal power failure	Off	Off	Off	Off	The motor power supply disconnects and the motor shaft releases
Single-chip microcomputer resetting	On	On	On	On	The motor power supply disconnects and the motor shaft releases
Hardware error	On	Off	On	On	The motor power supply disconnects and the motor shaft releases
Motor phase-to-phase error	On	Off	On	Blink quickly	The motor power supply disconnects and the motor shaft releases
Over-current alarm	On	Off	Blink quickly	Off	The motor power supply disconnects and the motor shaft releases
Over-voltage alarm	On	Off	Blink quickly	Blink quickly	The motor power supply disconnects and the motor shaft releases
Overheat alarm	On	Off	Blink slowly	Off	The motor power supply disconnects and the motor shaft releases
Under-voltage alarm	On	Off	On	Off	The motor power supply disconnects and the motor shaft releases
DIP switch error	On	Blink slowly	On	Off	The motor power supply disconnects and the motor shaft releases
Motor cable not connected	On	Off	On	Blink slowly	The motor power supply disconnects and the motor shaft releases
Normal running	On	On	Off	Off	The motor runs normally
Test running	On	Blink slowly	Off	Off	The motor runs normally
Braking	On	On	Off	On	The motor runs normally

⚠ **Note:**

- Blinking slowly means blinking at a frequency of 0.5 Hz, and blinking quickly means blinking at a frequency of 5Hz.
- To clear any alarm of the driver, it is necessary to disconnect the power supply and then reboot the driver.
- In the case of any alarm, it is necessary to cut the power supply off in time, and never touch the driver and motor when the power supply of the driver is on.
-

To be the partner of your success

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