

# Datasheet of the Digital Stepper Drive

## NM-4022



**20-36VDC, 2.2A Peak, Ultra Smoothness**

Version 0.0.1

## **Features**

- Anti-Resonance, provides optimum torque and nulls mid-range instability
- Motor self-test and parameter auto-setup technology, offers optimum responses with different motors
- Multi-Stepping allows a low resolution step input to produce a higher micro step output for smooth system performance
- Supply voltage up to +40 VDC
- Output current programmable, from 0.3A to 2.2A
- Pulse input frequency up to 75 KHz
- TTL compatible and optically isolated input
- Automatic idle-current reduction
- Support PUL/DIR and CW/CCW modes
- Over-voltage, over-current and phase-error protections
- Soft-start with no “jump” when powered on

## **Descriptions**

The NM-4022 is a versatility fully digital stepping driver based on a DSP with advanced control algorithm. The NM-4022 is the next generation of digital stepping motor controls. It brings a unique level of system smoothness, providing optimum torque and nulls mid-range instability. Motor self-test and parameter auto-setup technology offers optimum responses with different motors and easy-to-use. The driven motors can run with much smaller noise, lower heating, smoother movement than most of the drivers in the markets. Its unique features make the NM-4022 an ideal solution for applications that require low-speed smoothness.

## **Applications**

Suitable for a wide range of stepping motors, from NEMA frame size 14 to 23. It can be used in various kinds of machines, such as laser cutters, laser markers, high precision X-Y tables, labeling machines, and so on. Its unique features make the NM-4022 an ideal solution for applications that require low-speed smoothness.

## Specifications

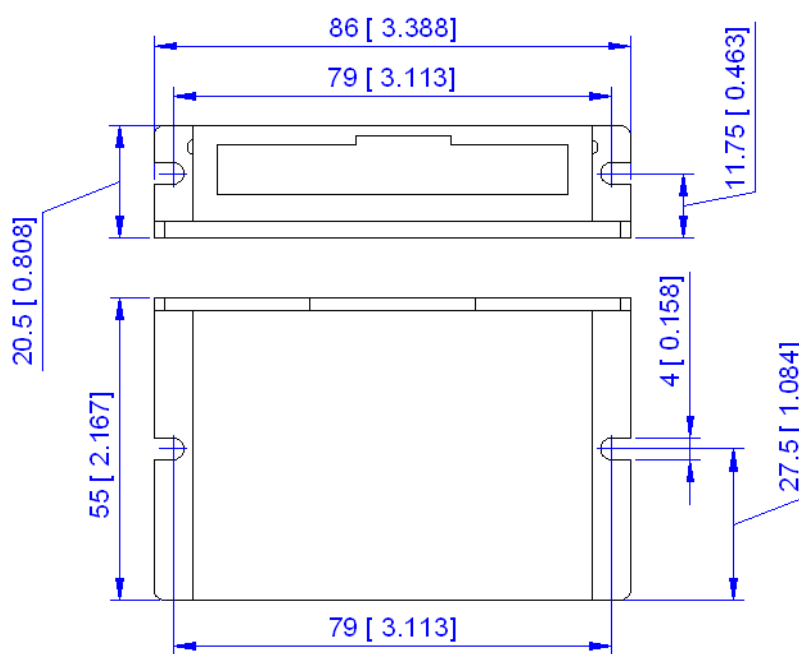
### Electrical Specifications

| Parameter             | Min | Typical | Max       | Unit |
|-----------------------|-----|---------|-----------|------|
| Input Voltage         | 18  | 24      | 40        | VDC  |
| Output Current        | 0.5 | -       | 2.2(Peak) | A    |
| Pulse Input Frequency | 0   | -       | 75        | kHz  |
| Logic Signal Current  | 7   | 10      | 16        | mA   |
| Isolation Resistance  | 500 | -       | -         | MΩ   |

### Operating Environment

| Cooling               | Natural Cooling or Forced cooling |   |
|-----------------------|-----------------------------------|---|
| Operating Environment | Environment                       | Avoid dust, oil fog and corrosive gases |
|                       | Storage Temperature               | -20°C – 65°C (-4°F – 149°F)             |
|                       | Ambient Temperature               | 0°C – 50°C (32°F – 122°F)               |
|                       | Humidity                          | 40%RH – 90%RH                           |
|                       | Operating Temperature (Heat Sink) | 70°C (158°F) Max                        |
| Storage Temperature   | -20°C – 65°C (-4°F – 149°F)       |   |
| Weight                | 100 g (3.53 oz)                   |   |

### Mechanical Specifications



## Protection Indications

The green indicator turns on when power-up. When drive protection is activated, the red LED blinks periodically to indicate the errors.

| Priority | Time(s) of Blink | Sequence wave of RED LED | Description             |
|----------|------------------|--------------------------|-------------------------|
| 1st      | 1                | ● ● ● ● ●                | Over-current protection |
| 2nd      | 2                | ● ● ● ● ●                | Over-voltage protection |
| 3rd      | 4                | ● ● ● ● ●                | Motor phase Error       |

## Connectors and Pin Assignment

The NM-4022 has three connectors, connector for control signals connections, connector for encoder feedback and connector for power and motor connections.

| Control Signal Connector - Screw Terminal |      |     |   |
|---|------|-----|---|
| Pin                                       | Name | I/O | Description   |
| 1   | PUL  | I   | <u>Pulse Signal</u> : This input represents pulse signal, each rising or falling edge active. 4-5V when PUL-HIGH, 0-0.5V when PUL-LOW. For reliable response, pulse width should be longer than 6.7μs. Series connect resistors for current-limiting when +12V or +24V used. The same as DIR and ENA signals.                           |
| 3   | DIR  | I   | <u>Direction Signal</u> : This signal has low/high voltage levels, representing two directions of motor rotation. For reliable motion response, DIR signal should be ahead of PUL signal by 5μs at least. 4-5V when DIR-HIGH, 0-0.5V when DIR-LOW.  |
| 4   | OPTO | I   | <u>+5V Common</u> : Opto-coupler power supply, and the typical voltage is +5V. Series connect resistors (at the PUL, DIR, ENA terminals) for current-limiting when +12V or +24V used.   |
| 5   | ENA+ | I   | <u>Enable Signal</u> : This signal is used for enabling/disabling the driver. In default, high level (NPN control signal) for enabling the driver and low level for disabling the driver. Usually left UNCONNECTED (ENABLED). Please note that PNP and Differential control signals are on the contrary, namely low level for enabling. |

### Connectors and Pin Assignment (Continued)

| Power and Motor Connector- Screw Terminal |      |     |  |
|---|------|-----|--|
| Pin                                       | Name | I/O | Description  |
| 1   | GND  | GND | Power Ground (Negative)  |
| 2   | +Vdc | I   | Power Supply Input (Positive), 20-36VDC recommended, leaving rooms for voltage fluctuation and back-EMF. |
| 3   | A+   | O   | Motor Phase A+   |
| 4   | A-   | O   | Motor Phase A-   |
| 5   | B+   | O   | Motor Phase B+   |
| 6   | B-   | O   | Motor Phase B-   |

### DIP Switches

#### Current Settings (SW1-SW3)

| Peak    | RMS   | SW1 | SW2 | SW3 |
|---------|-------|-----|-----|-----|
| Default |       | on  | on  | on  |
| 0.5A    | 0.35A | off | on  | on  |
| 0.7A    | 0.5A  | on  | off | on  |
| 1.0A    | 0.7A  | off | off | on  |
| 1.3A    | 0.9A  | on  | on  | off |
| 1.6A    | 1.2A  | off | on  | off |
| 1.9A    | 1.4A  | on  | off | off |
| 2.2A    | 1.6A  | off | off | off |

**Notes:** Due to motor inductance, the actual current in the coil may be smaller than the dynamic current setting, particularly under high speed condition.

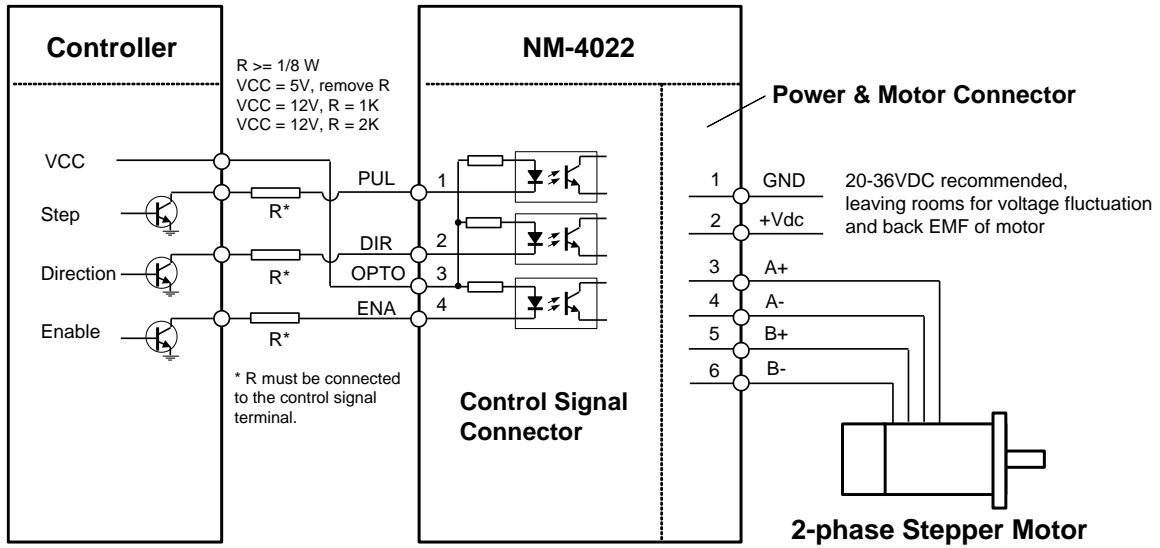
#### Full Current (SW4)

|     | On   | Off  |
|-----|--|--|
| SW4 | Full current is on or auto-current-reduction is turned off when motor is stop. | Full current is off or auto-current-reduction is turned on when motor is stop. The standstill current is half of the current setting. Set it on when lower motor heating is preferred. |

#### Micro Step Settings (SW5-SW6)

| Micro Step | Steps/rev.(for 1.8°motor)   | SW5 | SW6 |
|------------|-----------------------------|-----|-----|
| 1 to 512   | Default/Software Configured | on  | on  |
| 8          | 1600                        | off | on  |
| 16         | 3200                        | on  | off |
| 32         | 6400                        | off | off |

## Typical Connections



Connections to controller of sinking output