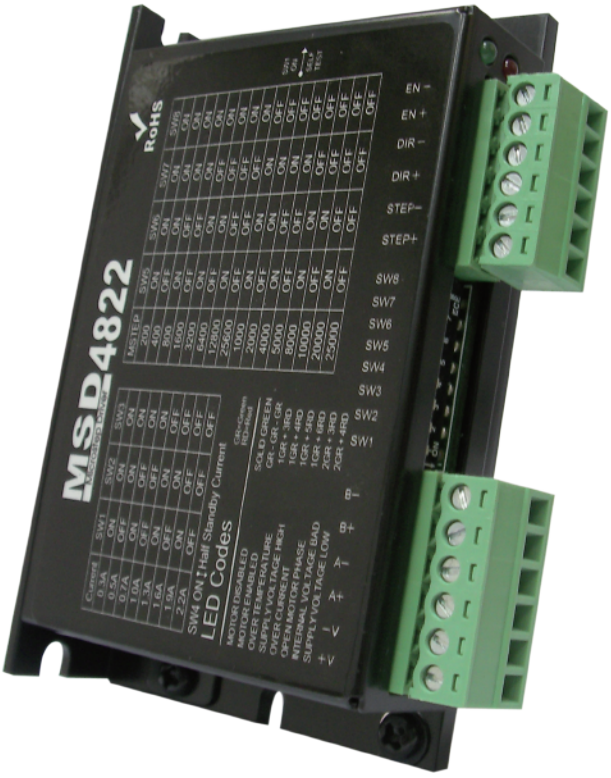


MSD4822

2 Phase Step Motor Drive

User Manual

Contents

1 Introduction

Thank you for selecting the MOONS' MSD4822 Step Motor Drive. We hope our commitment to performance, quality and economy will make a successful motion control project.

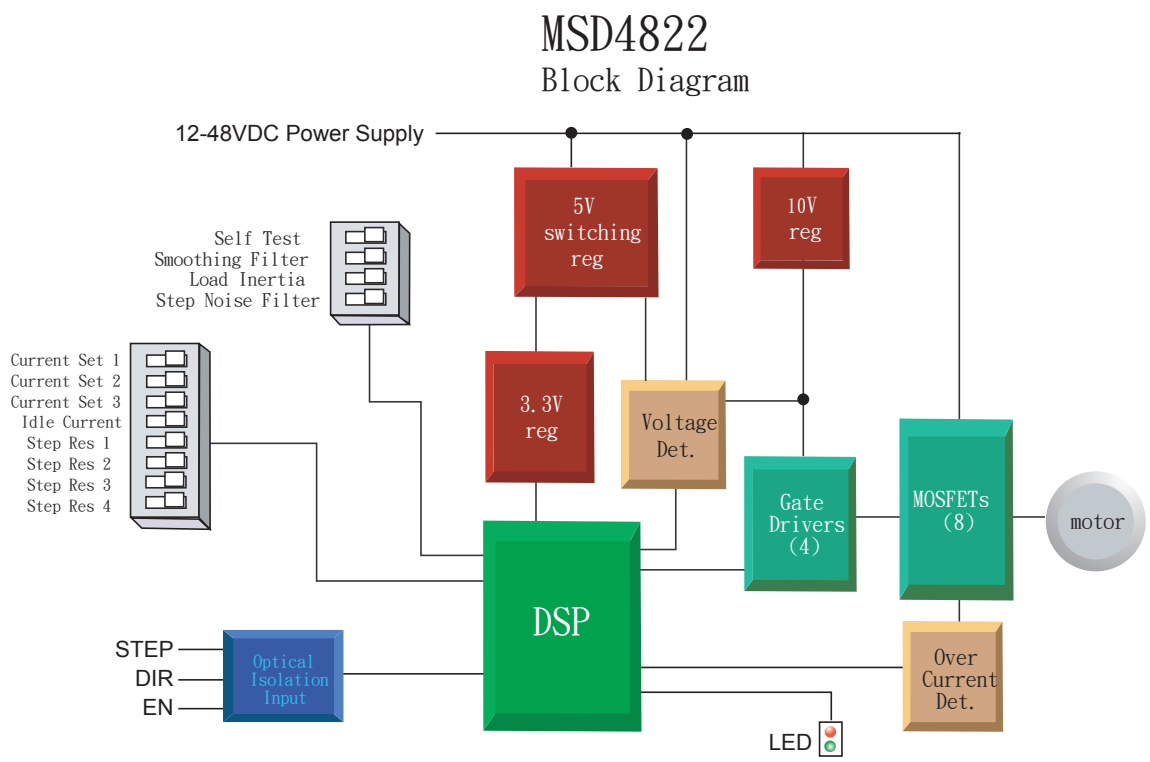
1.1 Overview

The MSD4822 series drives are cost-effective, high performance 2 phase step drives. The design is based on advanced digital current control technology, and features high torque, low noise, and low vibration. The running current, microstep resolution and other parameters are switch selectable.

1.2 Features

- Power Supply - operates from a 12 to 48 volt DC power supply
- Output Power - switch selectable, 8 settings, maximum 2.2 amps peak
- Current Control - advanced digital current control provides excellent high speed torque
- Microstep Resolution - switch selectable, 16 settings: 200, 400, 800, 1600, 3200, 6400, 12800, 25600, 1000, 2000, 4000, 5000, 8000, 10000, 20000, 25000 step/rev
- Speed Range - speeds up to 3000 rpm
- Anti Resonance - raises the system-damping ratio to eliminate midrange instability and allow stable operation throughout the speed range of the motor.
- Auto Setup - measures motor parameters and configures motor current control and anti-resonance gain settings
- Microstep Emulation - performs high resolution stepping by synthesizing coarse steps into fine micro-steps
- Control Modes - Step & Direction or CW/CCW pulse
- Input Digital Filters - 150 kHz or 2 MHz digital filter for high speed inputs
- Load Inertia Select - as part of the motor database each motor can be selected for use with low or high load inertia.
- Idle Current - switch selectable for 50% or 90% idle running current reduction 1 second after the motor stops
- Self Test - switch selectable, the drive will perform a 2 rev, 1 rps, CW/CCW move test
- Signal Smoothing - switch selectable, firmware configurable filtering removes spectral components from the command sequence, reducing jerk, limiting excitation of system resonance

1.3 Block diagram



2 Mounting the Drive

The MSD4822 Step Drive can be mounted on the wide or the narrow side of the chassis. If it is mounted on the wide side, M3 screws should be used through the four corner holes. For narrow side mounting applications, M3 screws can be used in the two side holes.

The amplifiers in the drive generate heat. To operate the drive continuously at maximum power, forced air cooling, as from a fan, should be provided.

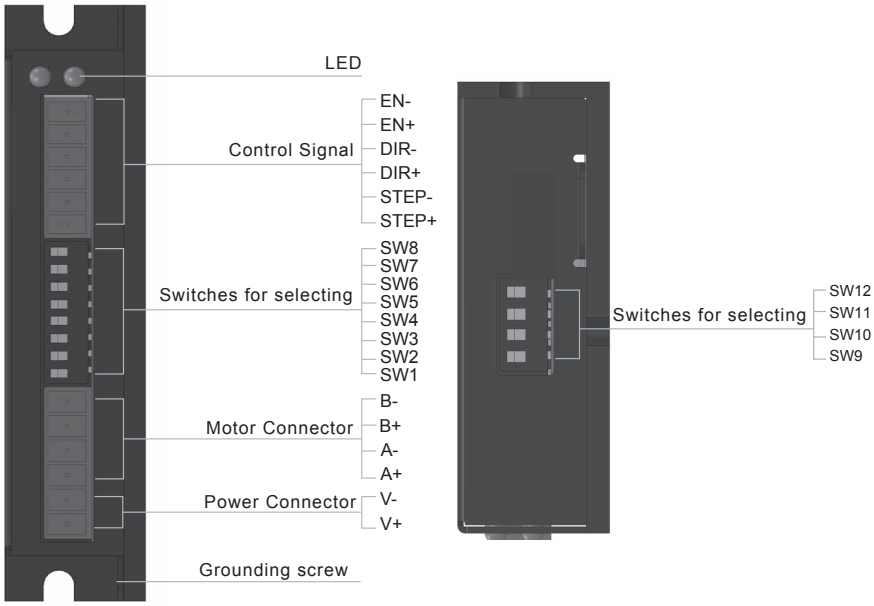
Never use the drive in a space where there is no air flow or where other devices can cause the surrounding air to be more than 40 °C. Never put the drive where it can get wet or where metal particles can fall into it.

3 Connections

To use the MSD4822 Step Drive, the following items are needed:

- A power supply (12 - 48 VDC)
- Pulse & Direction signal
- A compatible step motor

3.1 Connector Diagram



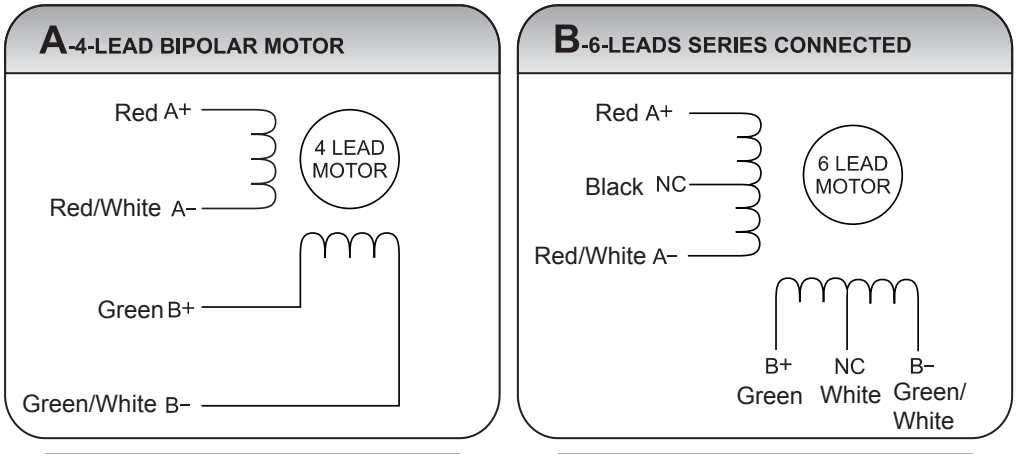
3.2 Connecting to the Power Supply

If the power supply does not have a fuse on the output or some kind of short circuit current limiting device, a fast acting fuse is required. A 3 amp fast acting fuse should be installed in line with the “+” power supply lead.

Connect the motor power supply “+” terminal to the drive terminal labeled “V+”. Connect the power supply “-” to the drive terminal labeled “V-”.

Be careful not to reverse the wires.

3.3 Connecting to a Motor



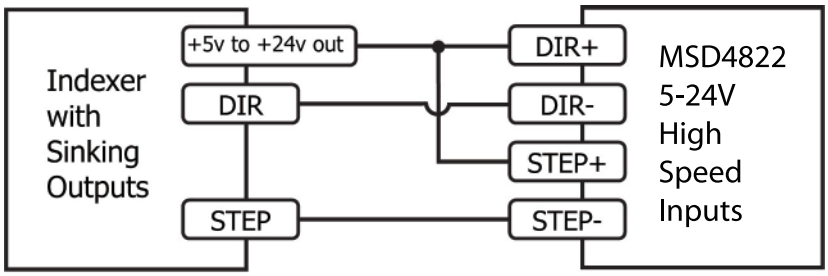
3.4 Connecting the Inputs

3.4.1 Step & Direction Inputs

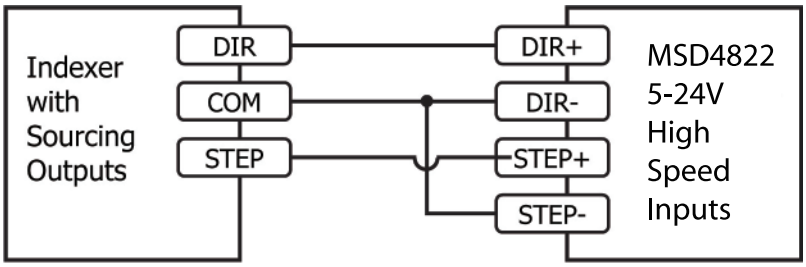
The MSD4822 Step Drive has two high speed optically isolated inputs called STEP and DIR that accept 5 to 24 volt single-ended or differential signals, up to 2MHz. The maximum voltage that can be applied to the input is 28V.

The motor executes one step with the falling edge of the STEP signal.

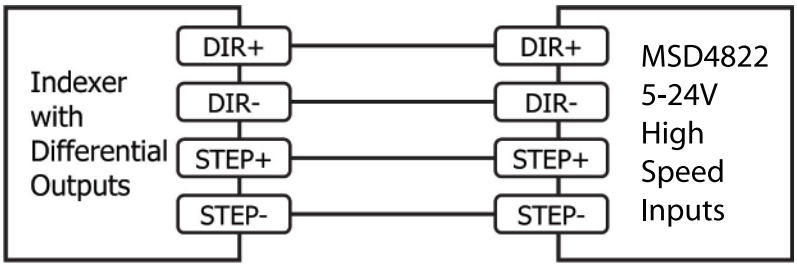
The direction of rotation is controlled by the DIR signal level. A low level signal (0 level) will result in clockwise rotation, and a high level signal (1 level) will result in counterclockwise rotation.



Connecting to Indexer with Sinking Outputs



Connecting to Indexer with Sourcing Outputs



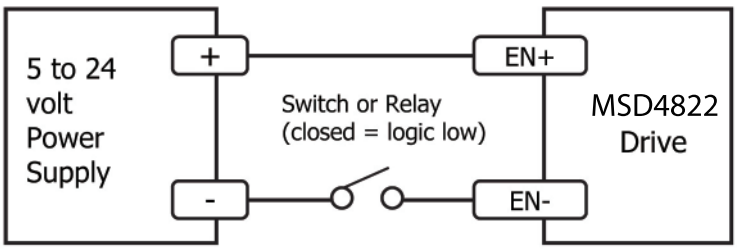
Connecting to Indexer with Differential Outputs
Many high-speed indexers have differential outputs

3.4.2 EN input

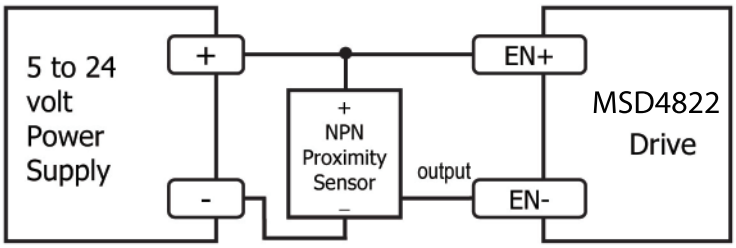
The EN input enables or disables the drive amplifier. It is an optically isolated input that accepts a 5 to 24 volt single-ended or differential signal. The maximum voltage that can be applied to the input is 28V.

When EN input is closed, the drive amplifier is deactivated. All the MOSFETs will shut down, and the motor will be free. When EN input is open, the drive is activated.

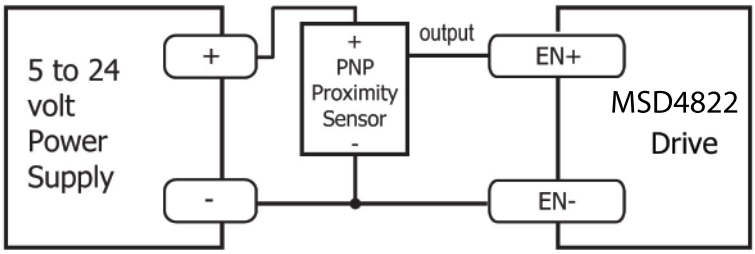
When the drive has encountered an error and the fault is removed from system, a falling signal into the EN input will reset the error status and activate the drive amplifier again.



Connecting the Input to a Switch or Relay

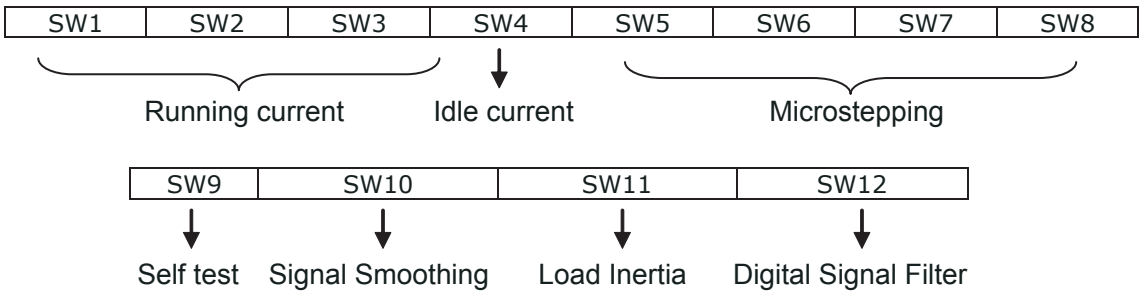


Connecting an NPN type Proximity Sensor to an input
(when prox sensor activates, input goes low)



Connecting an PNP type Proximity Sensor to an input
(when prox sensor activates, input goes low)

4 Switch Selecting



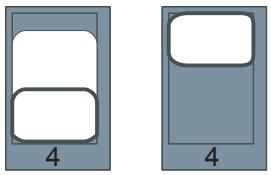
4.1 Running Current

The output current of the MSD4822 Step Drive is set by the SW1, SW2, and SW3 switches and can be changed as necessary. There are 8 settings available according to the ON/OFF combination of the switches.

Peak	SW1	SW2	SW3
0.3A	ON	ON	ON
0.5A	OFF	ON	ON
0.7A	ON	OFF	ON
1.0A	OFF	OFF	ON
1.3A	ON	ON	OFF
1.6A	OFF	ON	OFF
1.9A	ON	OFF	OFF
2.2A	OFF	OFF	OFF

4.2 Idle Current

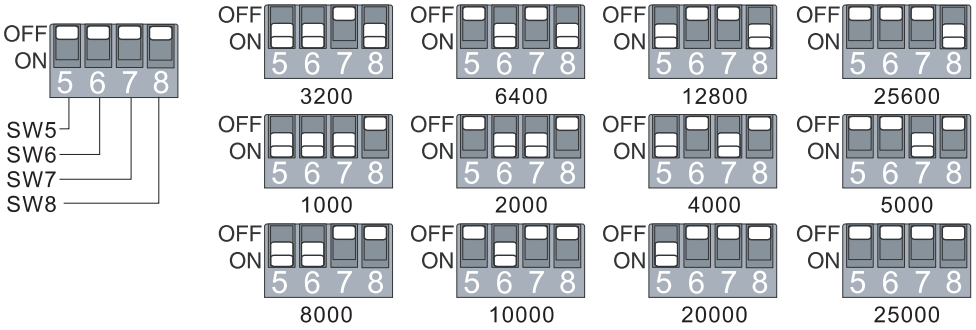
The running current of the MSD4822 drive is automatically reduced whenever the motor hasn't moved for 1 second. Setting the SW4 switch to ON reduces the current to 50% of its running value. Setting this switch to OFF maintains 90% of the running current. This 90% setting is useful when a high holding torque is required. To minimize motor and drive heating it is highly recommended that the idle current reduction feature be set to 50% unless the application requires the higher setting.



4.3 Microstepping

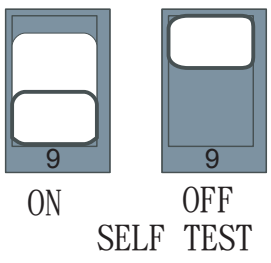
The microstep resolution is set by the SW5, SW6, SW7, and SW8 switches. There are 16 settings.

Microstep(step/rev)	SW5	SW6	SW7	SW8
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



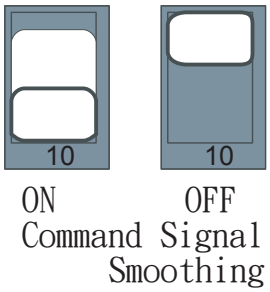
4.4 Self test

Setting switch SW9 to ON after the drive is powered up will cause the drive to perform a self test move of 2 revolutions both CW and CCW at 1rps. Setting switch SW9 to OFF will disable this feature.

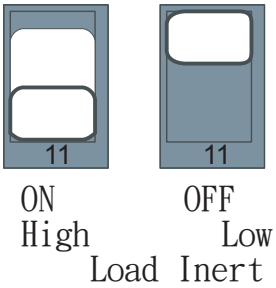


4.5 Command Signal Smoothing

Setting switch SW10 to ON selects this function; setting it to OFF will disable it. Command signal smoothing can soften the effect of immediate changes in velocity and direction, making the motion of the motor less jerky. An added advantage is that it reduces wear on mechanical components.This function can cause a short delay in following the control signal, and should be used with that in mind.



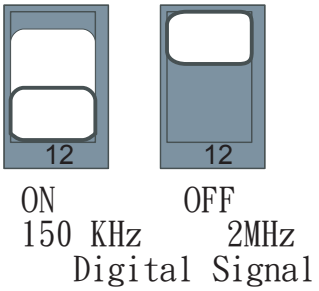
4.6 Load Inertia



Switch SW11 selects the load inertia. Set it to ON for high inertia applications and to OFF for low inertia applications. The load inertia selection can help the MSD4822 drive to calculate the current control parameter, which is used in Anti-Resonance. If the load inertia is close to that of the motor rotor, select the low (OFF) setting. If the load inertia is higher than that of the motor rotor, select the high (ON) setting.

4.7 Digital Signal Filter

Switch SW12 sets the digital signal filter. The STEP and DIR signal inputs have built-in digital filters and this setting will reduce external noise. If the system works on the low microstep, select the 150 KHz (ON) setting. If the system works on the high microstep, select the 2 MHz (OFF) setting.



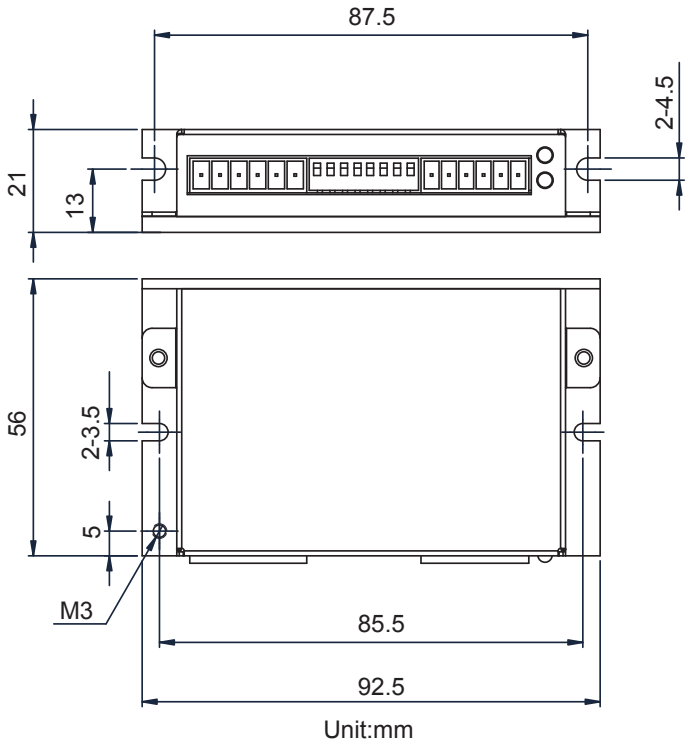
6 LED Error Codes

The MSD4822 Step Drive has one bicolor (red/green) LED to indicate status. When the motor is enabled, the green LED flashes slowly. When the green LED is solid, the motor is disabled. If the red LED flashes, an error has occurred. Errors are indicated by a combination of red and green flashes as follows:

Code	Error
Solid green	Motor disabled
Flashing green	Motor enabled
3 red，1 green	Over temperature
3 red，2 green	Bad internal voltage
4 red，1 green	Over voltage
4 red，2 green	Under voltage
5 red，1 green	Over current/short circuit
6 red，1 green	Open motor winding

7 Reference Materials

7.1 Mechanical Outline



7.2 Specifications

7.2.1 Electrical Specifications

Parameter	Min.	Typ.	Max.	Unit
Power Supply	12	-	48	VDC
Output Current (Peak)	0.3	-	2.2	Amps
STEP/DIR Input Signal Average Forward Current	6	10	15	mA
Step Frequency	2	-	2M	Hz
STEP Minimum Pulse Width Hi and Low	250	-	-	ns
DIR Minimum Pulse Width	50	-	-	us
Under Voltage Protection	-	10	-	VDC
Over Voltage Protection	-	52	-	VDC
Input signal Voltage	4.0	-	28	VDC
Driver Initialization time	-	-	2.5	S

7.2.2 Environmental Specifications

Heat Sinking Method	Natural cooling or fan-forced cooling
Surrounding Air Conditions	Avoid dust, oily mist and corrosive air
Operating Temperature	0 - 40°C (32 - 104°F)
Maximum Ambient Humidity	90% non-condensing
Shock	5.9m/s² maximum
Storage Temperature	-10 - 70°C (14 - 158°F)

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