Shenzhen ECON Technology Co.,Ltd

Contents

DH542-Ultra low noise , high stability and smoothness digital stepper drive

Introduction

1.Overview

DH542 is the new generation high performance fully digital stepper drive which base on 32bit DSP with a advanced algorithm .the power supply range is DC20~50V. it can drive frame size 42---57mm 2 phase stepper motor .

Ultra low noise and high smoothness at middle/low speed ,and high torque at high speed, which can be applied to different speed control applications. adopt smooth and accurate sinusoidal current vector control technology ,which make motor low heat .
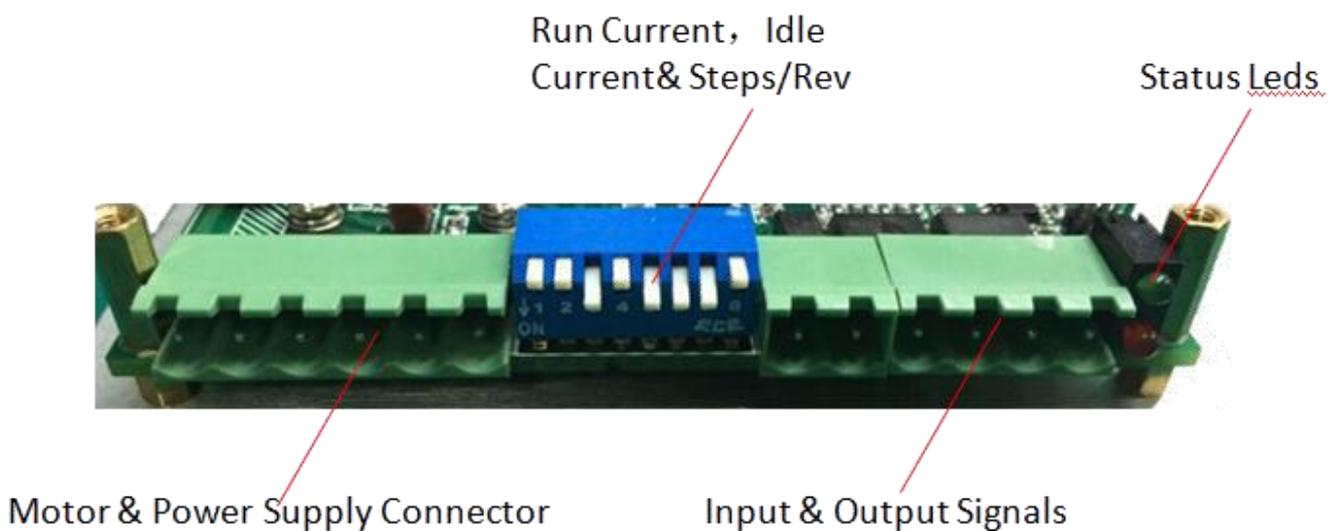

2. **Features**
●new generation 32bit DSP
●good smoothness ,low noise ,low heat
●build-in micro step setting
●build-in current setting
●the standstill current can be set to 50%
●opt-isolated differential pulse input
● the response frequency is up to 300KHz
●over voltage , under voltage, over current protection
●Operates from a 18 to 50 volt DC power supply
●Running current up to 4.2 amps per phase

3. **Applications**
It can be used in various kinds of machines ,such as dispenser machine. floating machine
3D printer, labeling machine, medical machine, laser cut machine, and so on ,its unique features make it an ideal solution for the applications which require low noise ,low vibration, low heat and high precision

Mounting dimension（unit：mm）

You can mount the drive on the wide or the narrow side of the chassis using #2 screws.If possible,the drive should be securely fastened to a smooth,flat metal surface that will help conduct heat away from the chassis. If this is not possible,then force airflow from a fan may be required to prevent the drive from overheating. See below installation image:
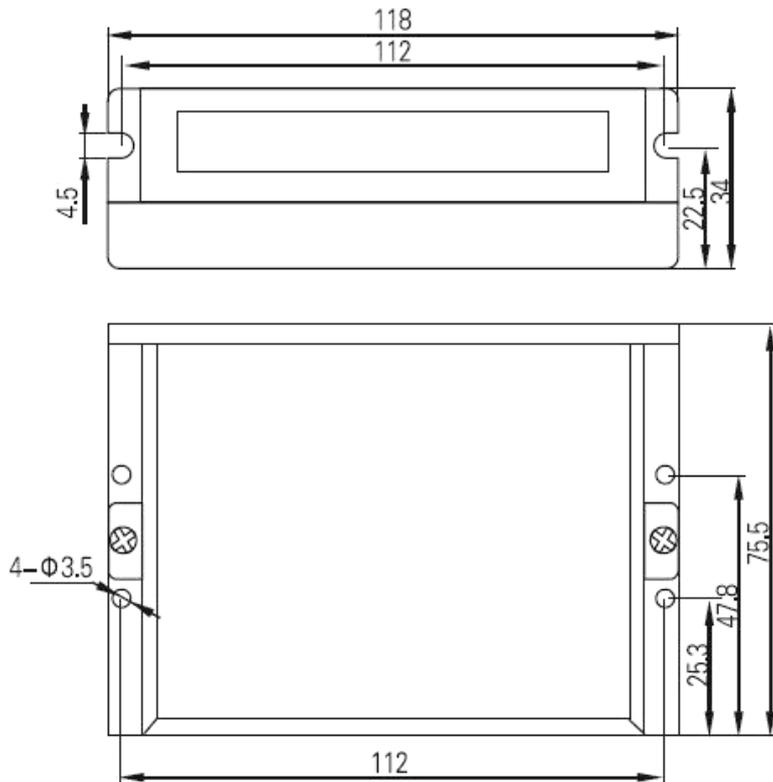
Note:

•**Never use the drive in a space where there is no air flow or where other devices cause the surrounding air to be more than 50℃.**

•**Never use the drive in a space where the temperature is under -10℃**

•**Never put the drive where it can get wet or where metal or other electrically conductive particles can get on the circuitry.**

•**Always provide air flow around the drive.When mounting multiple drives near each other,maintain at least one half inch of space between drives.**

Connecting the Power Supply

If you need information about choosing a power supply, please read the section Choosing a Power Supply
•Connect the power supply "+" terminal to the connector terminal labeled "V+"
•Connect power supply "-" to the connector terminal labeled "V-"
•The screw in the corner of drive shell should be connected to earth ground
•Use 18 or 20 gauge wire
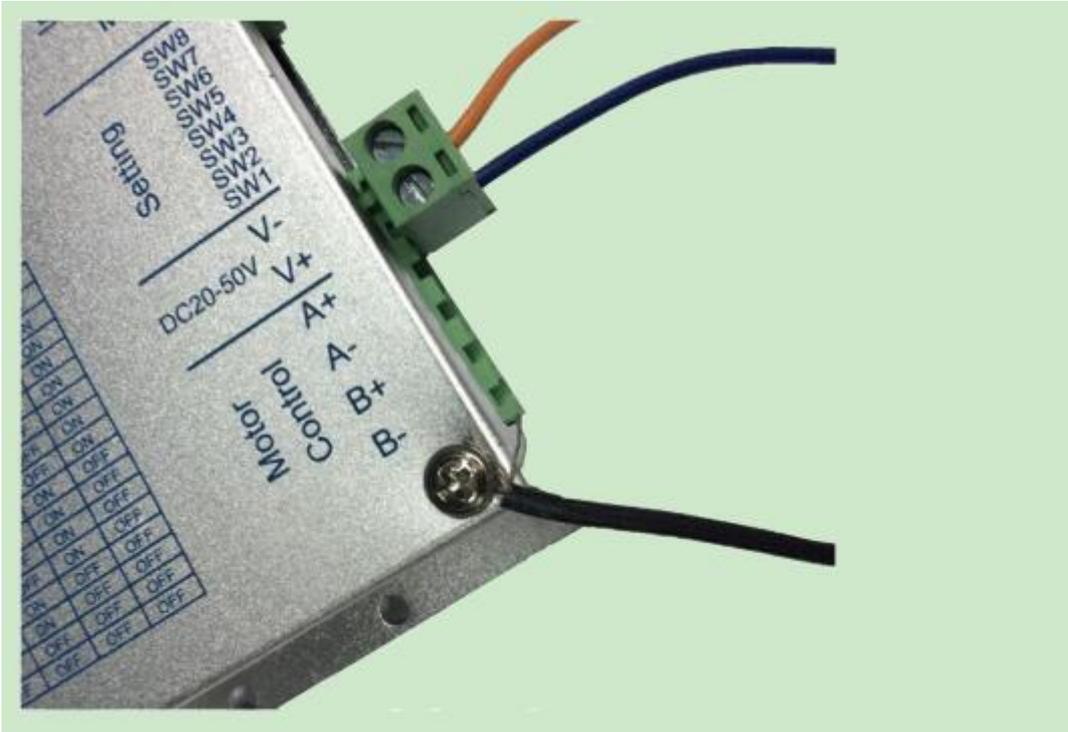
Power Supply and Ground Connections

Power Supply Selection

When choosing a power supply, there are many things to consider.You must decide what size of power supply (in terms of voltage and current) is needed for your application.

ECON Technology offers QL-200S-36(36V,5.5A) and QL-250S-24(24V,10A) for drive DH542.

Voltage

Your motor can provide more torque at higher speeds if a higher power supply voltage is used. Please consult the speed-torque curves later in this manual for guidance.
If you choose an unregulated power supply, make sure the no load voltage of the supply does not exceed the drive's maximum input voltage specification.

Current

The maximum supply current you could ever need is two times the motor current. However, you will generally need a lot less than that, depending on the motor type, voltage, speed and load conditions. The more the power supply voltage exceeds the motor voltage, the less current you'll need from the power supply. A motor running from a 48 volt supply can be expected to draw only half the supply current that it would with a 24 volt supply.

We recommend the following selection procedure:

1. If you plan to use only a few drives, get a power supply with at least twice "per phase" current rating of the step motor. Example: for a motor that's rated for 2 A/phase use a 4 A power supply..

2. If you are designing for mass production and must minimize cost, get one power supply with more than twice the rated current of the motor. Install the motor in the application and monitor the current coming out of the power supply and into the drive at various motor loads. This will tell you how much current you really need so you can design in a lower cost power supply.
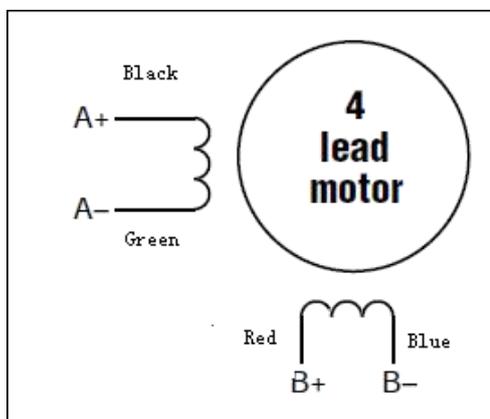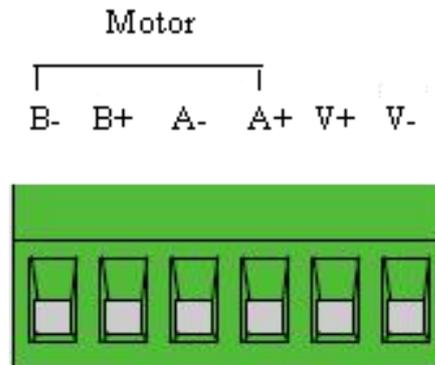
Motor Connecting

⚠️ *Never connect or disconnect the motor while the power is on.*

Four Lead Motor

These motors can only be connected one way. Please follow the sketch below.

Motor&Power Connector
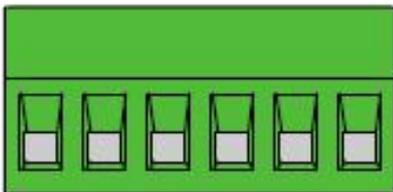
Connecting Input Signals

Remark:24V power need to series a 1.2k resistance

The DH542 drives have three inputs:
• STEP: a high speed digital input for step pulse commands, 5-24 volt logic
• DIR: a high speed digital input for the direction signal, 5-24 volt logic
• EN: a 5-24V input for commanding the removal of power from the motor

Connector Pin Diagram   **Internal Circuit Diagram**

MF- MF+ DR- DR+ PU- PU+
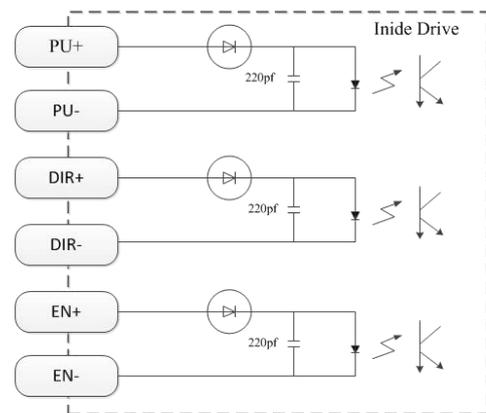
Connection Examples:STEP&DIR

Connection Examples:EN

Connecting an input to a switch or relay

Connecting another drive to EN

Most PLC use NPN Proximity Sensor
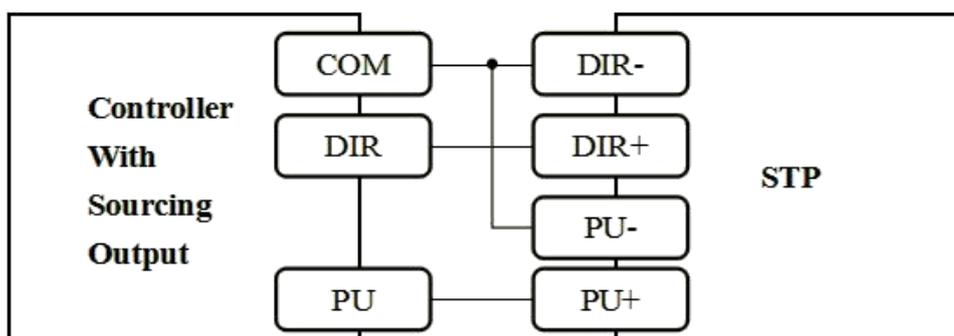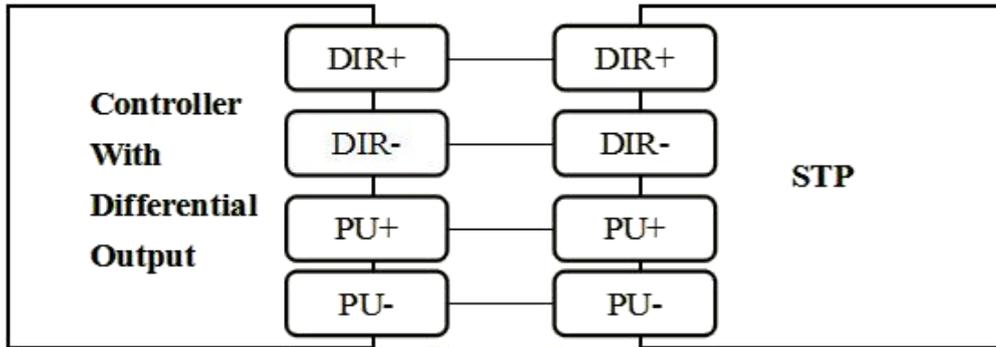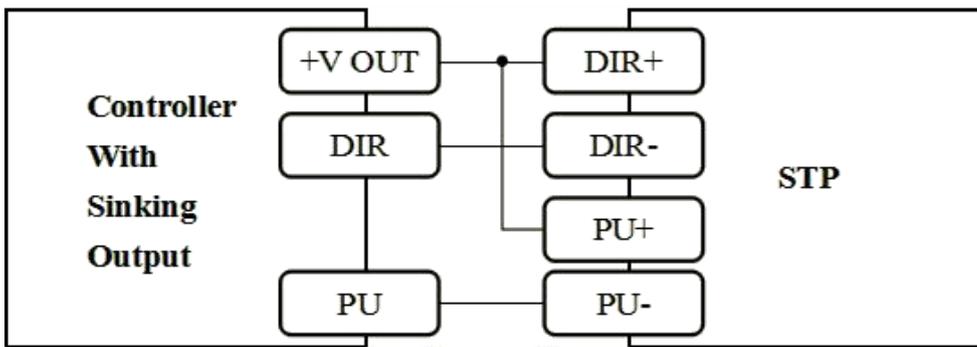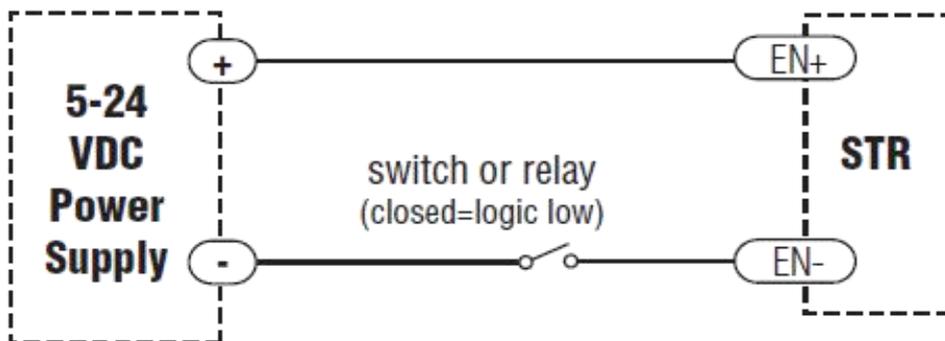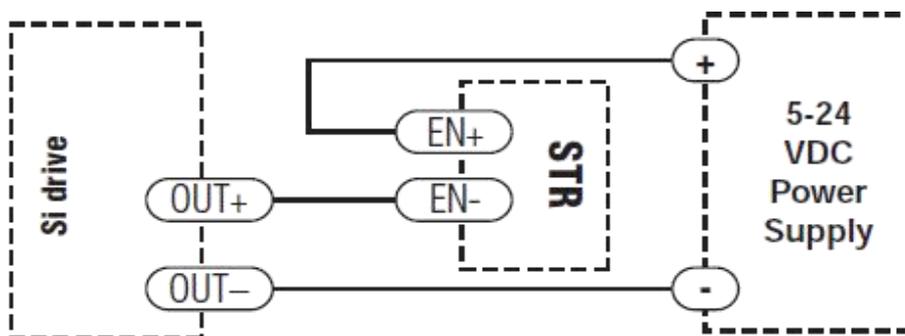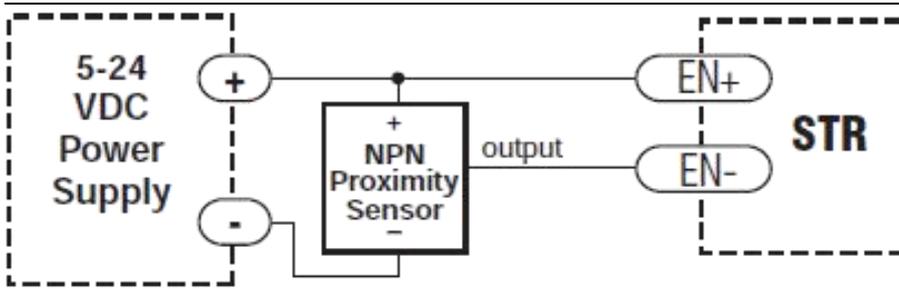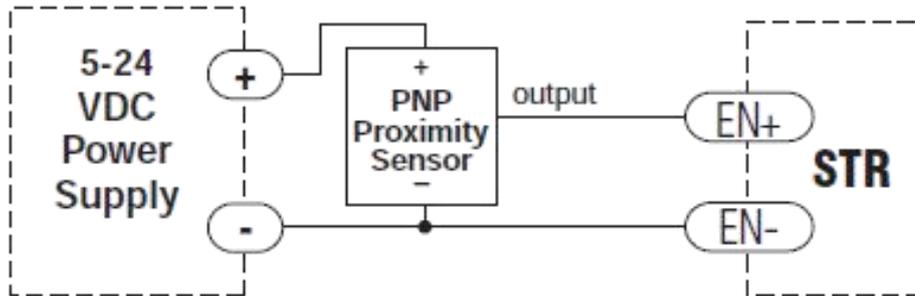

Configuring the Drive

Step 1: Selecting a Motor

The DH542 drive is optimized for use with carefully selected motors. To select a motor, simply move the rotary switch to the letter or number that corresponds to the motor of your choice. You can do this while power is on, but it is safer to select the motor before applying power to the drive so that you do not risk applying too much current to your motor.

If your motor is not on the list, please set the switch to a selection whose rotor inertia, holding torque and current are within 10% of your motor. Custom configurations can be added for qualifying applications.

DH542 Motor Table

Item	Motor	Wiring	Current	Holding Torque	Rotor Inertia
			A	oz-in	g.cm²
1	QL42HD40-01A	4 leads	1.2	57	54
2	QL42HD47-01A	4 leads	1.2	68.5	77
3	QL42HD60-01A	4 leads	1.2	103	110
4	QL57HD56-034A	4 leads	3	171.4	280
5	QL57HD-0384A	4 leads	3	171.4	280
6	QL57HD76-034A	4 leads	4	285.7	480
7	QL57HD76-0384A	4 leads	4	285.7	480

Step 2: Setting the Current

The maximum current for the motor you have selected is set automatically when you set the rotary switch. But you may want to reduce the current to save power or lower motor temperature. This is important if the motor is not mounted to a surface that will help it dissipate heat or if the ambient temperature is expected to be high.

Step motors produce torque in direct proportion to current, but the amount of heat generated is roughly proportional to the square of the current. If you operate the motor at 90% of rated current, you'll get 90% of the rated torque. But the motor will produce approximately 81% as much heat. At 70% current, the torque is reduced to 70% and the heating to about 50%.

Three of the small switches on the front of the DH542 drive are used to set the percent of rated current that will be applied to the motor: SW1,SW2 and SW3. Please set them according to the illustration below.

Peak current(A)	RMS current (A)	SW1	SW2	SW3
1.0	0.7	OFF	OFF	OFF
1.4	1.0	ON	OFF	OFF
1.9	1.4	OFF	ON	OFF
2.4	1.7	ON	ON	OFF
2.8	2.0	OFF	OFF	ON
3.2	2.3	ON	OFF	ON
3.8	2.7	OFF	ON	ON
4.2	3.0	ON	ON	ON

Step 3:Setting Idle Current

Motor heating and power consumption can also be reduced by lowering the motor current when it is not moving. One small switch on the front of drive can set the idle current,SW4 is ON,then the current is 100%,when SW4 is OFF,the current is 50%. The 50% idle current setting will lower the holding torque to 50%, which is enough to prevent the load from moving in most applications. This reduces motor heating by 75%. In some applications, such as those supporting a vertical load, it is necessary to provide a high holding torque. In such cases, the idle current can be set to 90% as shown below.

SW4：OFF=Half Current
ON=Full Current

Step 4:Micro step setting

Pul/rev	SW6	SW7	SW8
200	ON	ON	ON
400	ON	ON	ON
800	OFF	ON	ON
1600	OFF	ON	ON
3200	ON	OFF	ON
6400	ON	OFF	ON
12800	OFF	OFF	ON
25600	OFF	OFF	ON
1000	ON	ON	OFF
2000	ON	ON	OFF
4000	OFF	ON	OFF
5000	OFF	ON	OFF
8000	ON	OFF	OFF
10000	ON	OFF	OFF
20000	OFF	OFF	OFF
25000	OFF	OFF	OFF

Reference Materials

Drive Interface description

Name	function	description
PWR	Power light	When power on ,the green light is on
ALARM	Over current/under voltage/over voltage displaying light	If the drive Over current/under voltage/over voltage, the red light is on
PU+	Pulse input positive	Pulse signal: In single pulse (pulse/direction) mode, this input represents pulse signal, each falling edge active; 4-5V for High -level, 0-0.5V for low-level Series connect resistors for current-limiting when +12V or +24V used.(should connect 1k resistor for +12V,2k for +24V)
PU-	Pulse input negative	Pulse signal: In single pulse (pulse/direction) mode, this input represents pulse signal, each falling edge active; 4-5V for High -level, 0-0.5V for low-level
DR+	Direction input positive	DIR signal: In single-pulse mode, this signal has low/high voltage levels, representing two directions of motor rotation; Series connect resistors for current-limiting when +12V or +24V used.(should connect 1k resistor for +12V,2k for +24V)
DR-	Direction input negative	DIR signal: In single-pulse mode, this signal has low/high voltage levels, representing two directions of motor rotation;
MF+	Enable input positive	Enable signal: This signal is used for enabling/disabling driver. High level for enabling the driver and low level for disabling the driver. Usually left **UNCONNECTED (ENABLED)**. Series connect resistors for current-limiting when +12V or +24V used.(should connect 1k resistor for +12V,2k for +24V)
MF-	Enable input negative	Enable signal: This signal is used for enabling/disabling driver. High level for enabling the driver and low level for disabling the driver. Usually left **UNCONNECTED (ENABLED)**.
V-	Power input COM	DC20-50V
V+	Power input VCC	
A+,A-	Motor A phase	Connect to Motor A phase
B+,B-	Motor B phase	Connect to Motor B phase

Note!

1: Connect power supply rightly ,can't exceed 50VDC

2: If the control signal (PU, DR,MF) is over 5V ,please connect resistors (at the PU+, DR+, MF+ terminals) for current-limiting.

3:if the alarm light is on ,please check it after power off

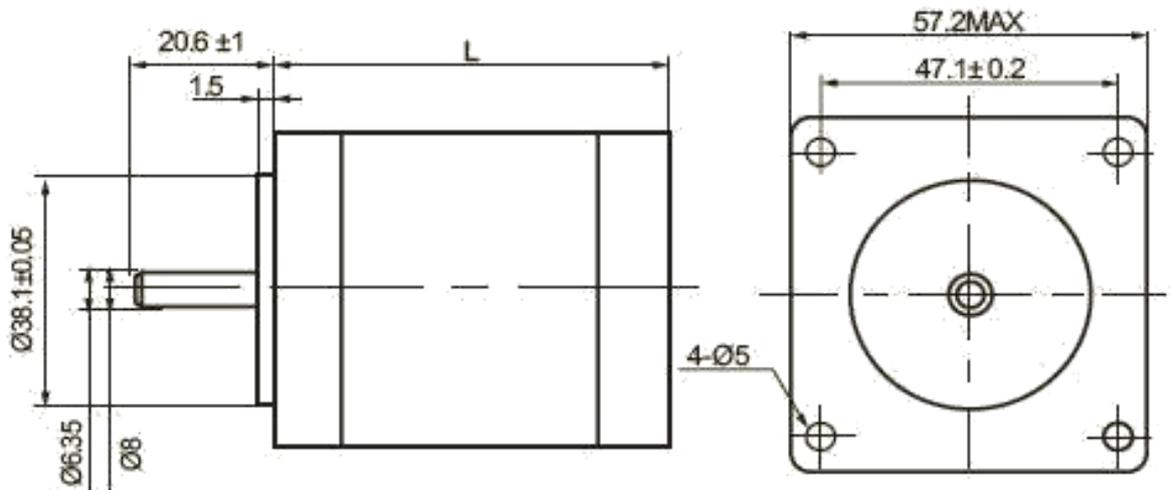A :Check the power supply range is lower than 20V or higher than 50V

B:Connect power supply after eliminate motor wiring and other circuit short problems

Motor Drawing
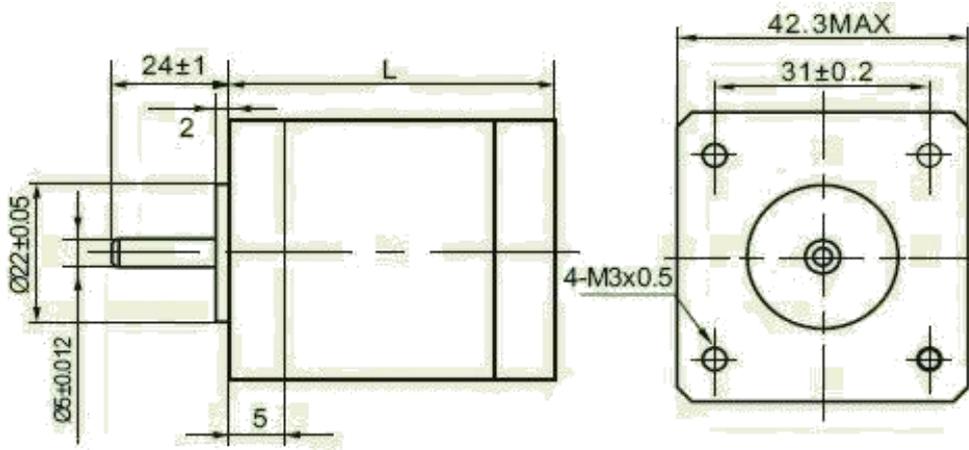
Motor	Length(L)
QL42HD40-01A	41±1mm
QL42HD47-01A	49±1mm
QL42HD60-01A	61±1mm

QL42 Outline Drawing

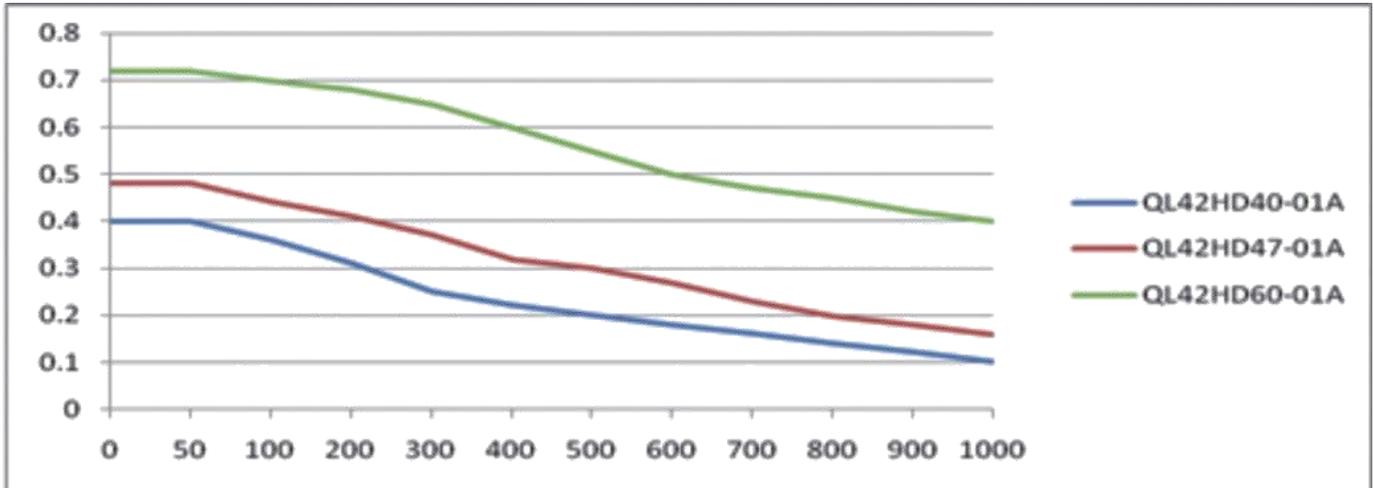| Motor	Length(L)
QL57HD56-034A	56±1mm
QL57HD56-0384A	56±1mm
QL57HD76-034A	76±1mm
QL57HD76-0384A	76±1mm

QL57 Outline Drawing

Torque-Speed Curve

QL42 with DH542
Connection:4 leads
24V DC Power supply

QL57 with DH542
Connection:4 leads
24V DC Power supply