# CNC CONTROLLER SPARE SPECIFICATION

# Power Supply

## Application

The switching power supply can be widely used in communication, LED display, industrial control and CNC Stepper & Servo System, radio and television, computer network, medical equipment, intelligent monitoring and other fields. 115V and 230V can be selected by switch. Powerful functions and professional designs (Built-in big fan for cooling) ensure high efficiency and high reliability of the power supply.

## Feature

The main feature of 350W 24V Single Output Switching Power Supply:

- AC input selectable by switch
- Withstand 300VAC surge input for 5 seconds
- Protections: Short circuit/ Overload/ Over voltage/ Over temp.
- Built-in fan ON/OFF control
- Built-in constant current limiting circuit
- 100% full load burn-in test
- LED indicator for power on
- Low cost, high reliability
- 2 years warranty

## Description

- AC input voltage range: 90-132VAC/180-264VAC selectable by switch
- DC adjustment range:  ±1.0% rated output range
- Overload protection: 105%-135% rated output power
- Over voltage protection: 27.6~32.4V
- Setup, rise time: 1000ms, 50ms/230VAC, 1000ms, 50ms/115VAC at full load
- Withstand Voltage: I/P-O/P: 3kVAC, I/P-FG:2kVAC, O/P-FG:0.5kVAC
- Working temperature: -20~+60C (refer to output derating curve)

# Technical data

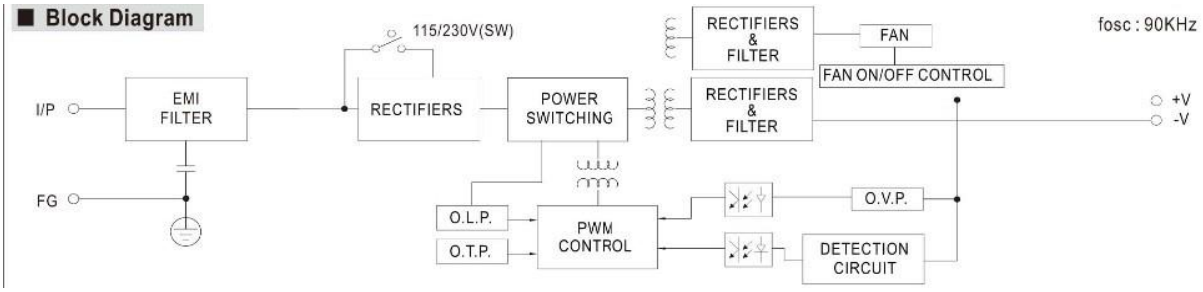
## SPECIFICATION

| MODEL | | NES-350-3.3 | NES-350-5 | NES-350-7.5 | NES-350-12 | NES-350-15 | NES-350-24 | NES-350-27 | NES-350-36 | NES-350-48 |
|---|---|---|---|---|---|---|---|---|---|---|
| OUTPUT | DC VOLTAGE | 3.3V | 5V | 7.5V | 12V | 15V | 24V | 27V | 36V | 48V |
| | RATED CURRENT | 60A | 60A | 46A | 29A | 23.2A | 14.6A | 13A | 9.7A | 7.3A |
| | CURRENT RANGE | 0 ~ 60A | 0 ~ 60A | 0 ~ 46A | 0 ~ 29A | 0 ~ 23.2A | 0 ~ 14.6A | 0 ~ 13A | 0 ~ 9.7A | 0 ~ 7.3A |
| | RATED POWER | 198W | 300W | 345W | 348W | 348W | 350.4W | 351W | 349.2W | 350.4W |
| | RIPPLE & NOISE (max.) Note.2 | 150mVp-p | 150mVp-p | 150mVp-p | 150mVp-p | 150mVp-p | 150mVp-p | 200mVp-p | 240mVp-p | 240mVp-p |
| | VOLTAGE ADJ. RANGE | 2.97 ~ 3.7V | 4.5 ~ 5.6V | 6 ~ 9V | 10 ~ 13.5V | 13.5 ~ 18V | 20 ~ 26.4V | 26 ~ 32V | 32~40V | 41 ~ 56V |
| | VOLTAGE TOLERANCE Note.3 | +3%,-4.5% | ±3.0% | ±2.0% | ±1.5% | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% |
| | LINE REGULATION | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% |
| | LOAD REGULATION | ±2.5% | ±2.0% | ±2.0% | ±1.0% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% |
| | SETUP, RISE TIME | 1000ms, 50ms/230VAC 1000ms,50ms/115VAC at full load | | | | | | | | |
| | HOLD UP TIME (Typ.) | 20ms/230VAC 16ms/115VAC at full load | | | | | | | | |
| INPUT | VOLTAGE RANGE Note.4 | 90 ~ 132VAC / 180 ~ 264VAC by switch 254 ~ 370VDC | | | | | | | | |
| | FREQUENCY RANGE | 47 ~ 63Hz | | | | | | | | |
| | EFFICIENCY (Typ.) | 74% | 78% | 80% | 83% | 84% | 87% | 88% | 87.5% | 87.5% |
| | AC CURRENT (Typ.) | 7A/115VAC 4A/230VAC | | | | | | | | |
| | INRUSH CURRENT (Typ.) | 40A/115VAC 60A/230VAC | | | | | | | | |
| | LEAKAGE CURRENT | <3.5mA / 240VAC | | | | | | | | |
| PROTECTION | OVER LOAD | 105 ~ 135% rated output power | | | | | | | | |
| | | Protection type : Constant current limiting, recovers automatically after fault condition is removed | | | | | | | | |
| | OVER VOLTAGE | 3.8 ~ 4.6V | 5.75 ~ 7.5V | 9.4 ~ 11.25V | 13.8 ~ 16.2V | 18 ~ 21V | 27.6 ~ 32.4V | 33.7 ~ 39.2V | 41.4~46.8V | 57.6 ~ 67.2V |
| | | Protection type :Shut down O/P voltage, re-power on to recover | | | | | | | | |
| | OVER TEMPERATURE | 90℃±5℃(3.3~7.5V); 85℃±5℃(12~15V); 80℃±5℃(24V);75℃±5℃(27~48V) (TSW1) Detect on case | | | | | | | | |
| | | Protection type : Shut down O/P voltage, recovers automatically after temperature goes down | | | | | | | | |
| FUNCTION | FAN ON/OFF CONTROL(Typ.) | RTH2≧50℃ FAN ON, ≦45℃ FAN OFF (3.3 ~ 7.5V) | | | | | | | | |
| | | RTH2≧55℃ FAN ON, ≦50℃ FAN OFF (12 ~ 48V) | | | | | | | | |
| ENVIRONMENT | WORKING TEMP. | -20 ~ +60℃ (Refer to output load derating curve) | | | | | | | | |
| | WORKING HUMIDITY | 20 ~ 90% RH non-condensing | | | | | | | | |
| | STORAGE TEMP., HUMIDITY | -20 ~ +85℃, 10 ~ 95% RH | | | | | | | | |
| | TEMP. COEFFICIENT | ±0.03%/℃ (0 ~ 50℃) | | | | | | | | |
| | VIBRATION | 10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes | | | | | | | | |
| SAFETY | SAFETY STANDARDS | UL60950-1 approved | | | | | | | | |
| | WITHSTAND VOLTAGE | I/P-O/P:3KVAC I/P-FG:2KVAC O/P-FG:0.5KVAC | | | | | | | | |
| | ISOLATION RESISTANCE | I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500VDC / 25℃/ 70% RH | | | | | | | | |
| OTHERS | MTBF | 234.3K hrs min. MIL-HDBK-217F (25℃) | | | | | | | | |
| | DIMENSION | 215*115*50mm (L*W*H) | | | | | | | | |
| | PACKING | 1.07Kg; 12pcs/13.5Kg/0.92CUFT | | | | | | | | |
| NOTE | 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.<br>2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.<br>3. Tolerance : includes set up tolerance, line regulation and load regulation.<br>4. Please connect positive pole of input voltage with mark "L" of terminal block, connect negative pole of input voltage with mark "N" of terminal block, using DC voltage for input voltage. | | | | | | | | | |

File Name:NES-350-SPEC 2013-08-19

# Diagram

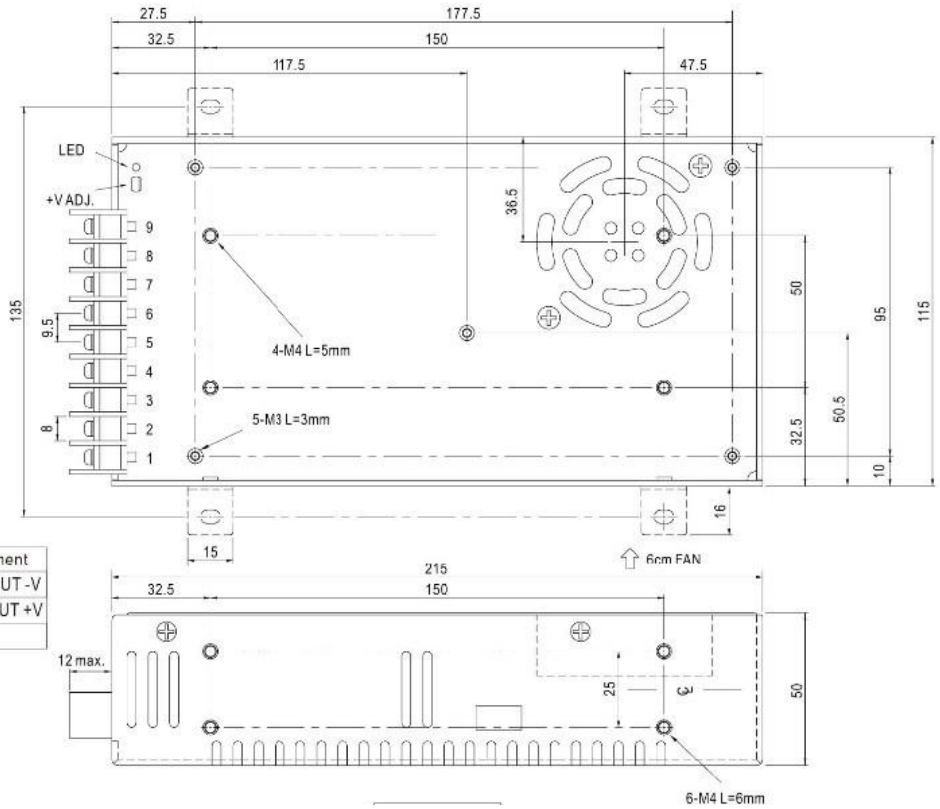
## ■ Block Diagram



# Dimension

## ■ Mechanical Specification

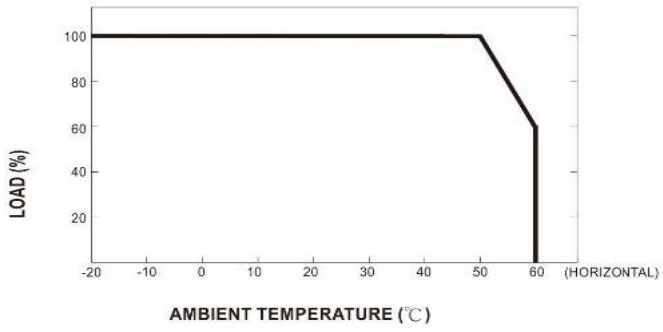
Case No. 912C Unit:mm



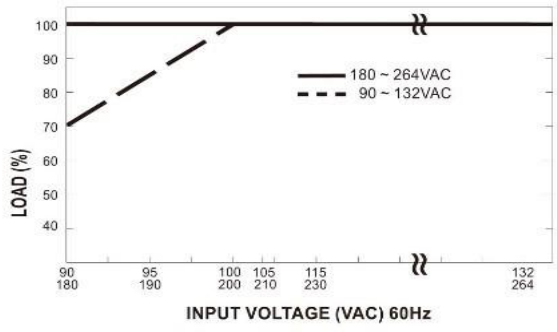

Terminal Pin No. assignment :

| Pin No. | Assignment | Pin No. | Assignment |
|---|---|---|---|
| 1 | AC/L | 4~6 | DC OUTPUT -V |
| 2 | AC/N | 7~9 | DC OUTPUT +V |
| 3 | FG ⏚ | | |

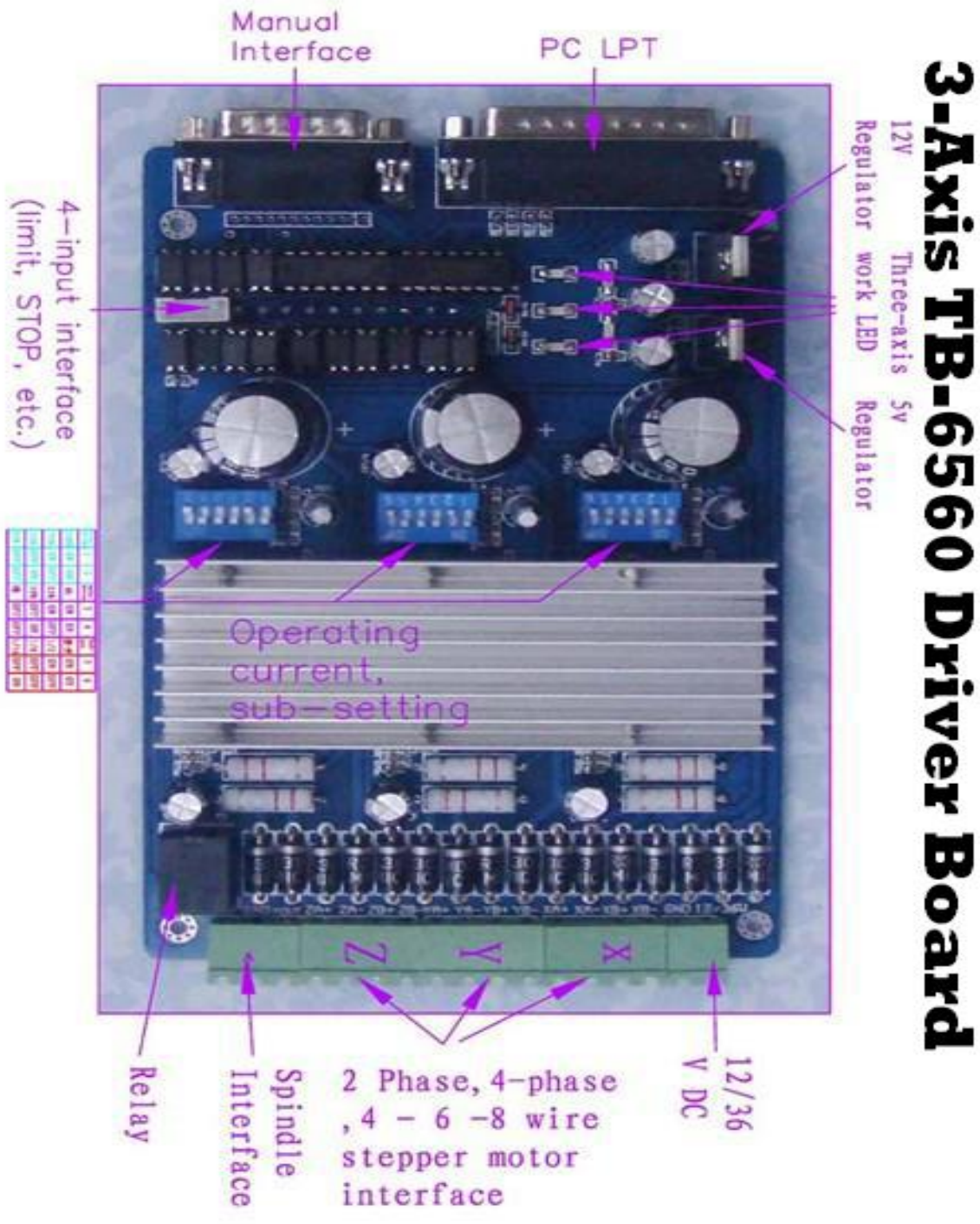
## ■ Derating Curve




## ■ Static Characteristics



# DRIVER BOARD



## Feature

1. Toshiba TB6560AHQ chip - High power, maximum 3.5A drive current chipset !
2. 1-1/16 microstep setting - Higher accuracy and smoother operation than standard 1, 1/2 step!
3. Adjustable drive current settings for each axis - 25%,50%,75%,100% of full current can be set for different stepper motors
4. Overload, over-current and over-temperature safety - Full protection for your computer and peripheral equipment !
5. On board current switching - Power output can be set according to specific user requirement !
6. Full closed-type optical isolation to protect the user's computer and equipment
7. Relay spindle interface - Outputs Max. 36V 7.5A for spindle motors or coolant pump (only one device can be powered by this output!)
8. 4 channel inputs interface- Can be used for XYZ limit and emergency stop !
9. Professional design - Two stage signal processing with super anti-jamming !
10. Bipolar constant current chopper drive with non-resonant region - Controls motors smoothly through range without creep effect !
11. Four control inputs (divided into pairs of knives) - Allows setting of limit and emergency stop !
12. Universal architecture - Supports most parallel software MACH3,KCAM4 etc!
13. For compatibility with other softwares, please feel free to contact us!

## Details

- Power supply DC 12-36V(power supply not included, please feel free to contact us if you need !)
- This driver get its power from the same unit as the steppers, it doesn't require a separate power source.
- Voltage Selection:
- 12-16V DC power supply for Nema 17 stepper motors
- 16-24V DC power supply for Nema 23 stepper motors
- 24-36V DC power supply for Nema 34 stepper motors

(High voltage will burn up the chips or stepper motors!!!)

Output current of the power supply can be calculated by the following expressions:

- Output current = Rated current of your stepper motors *quantity + 2A
- (For example, if you want to drive 3*3A Nema 23 stepper motors, theoretically 24V 11A DC power supply is recommended, but higher power such as 24V 15A also will be good
- Could drive 4 pieces stepper motors with current less than 3.5A at the same time.
- Driver compatible with 2 or 4 phase (4,6 or 8 lead) stepper motors
- Suitable for unipolar or bipolar stepper motors.
- **Bipolar PWM output with constant current**

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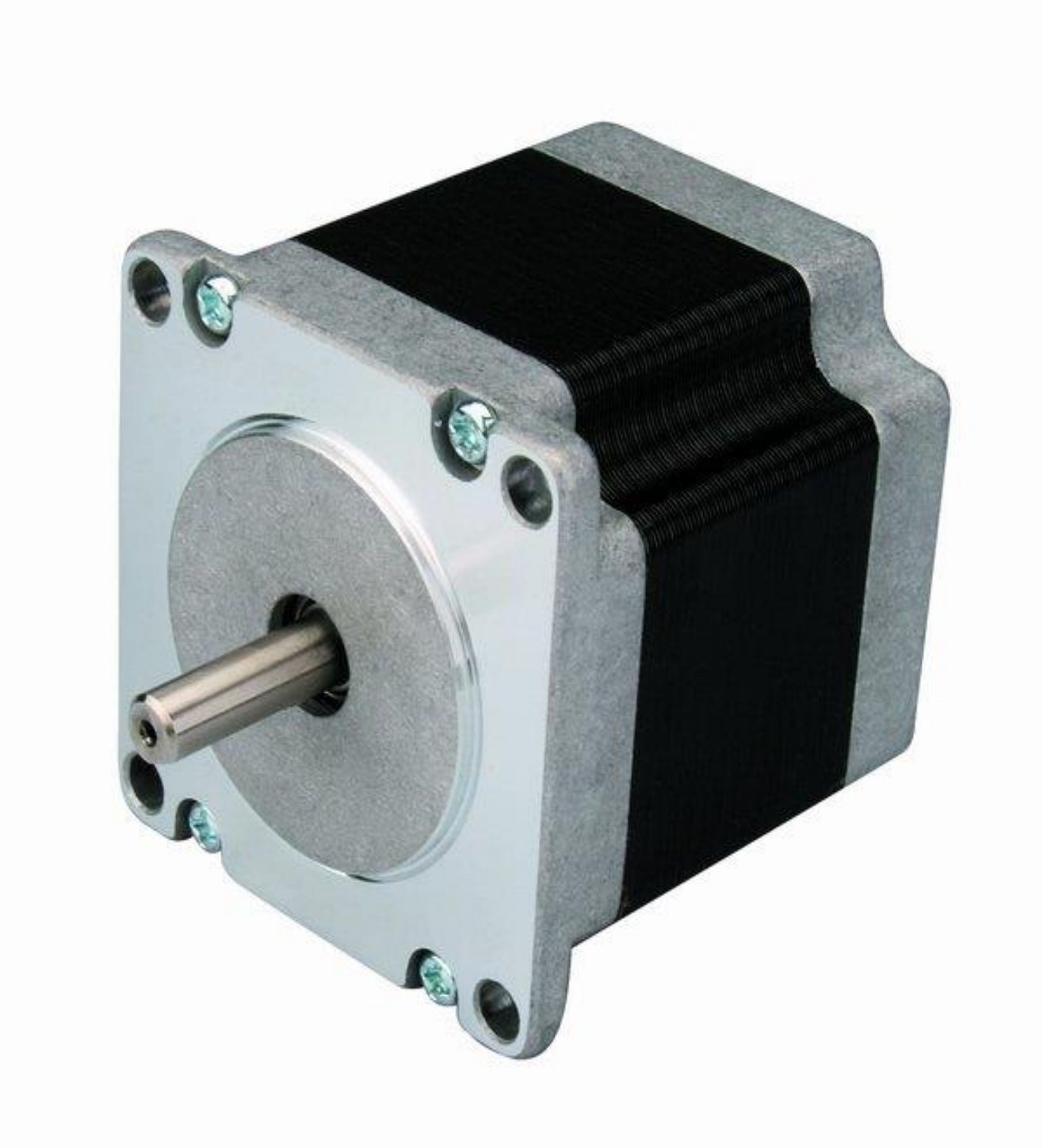
**Dip settings  of TB6560 Driver:**

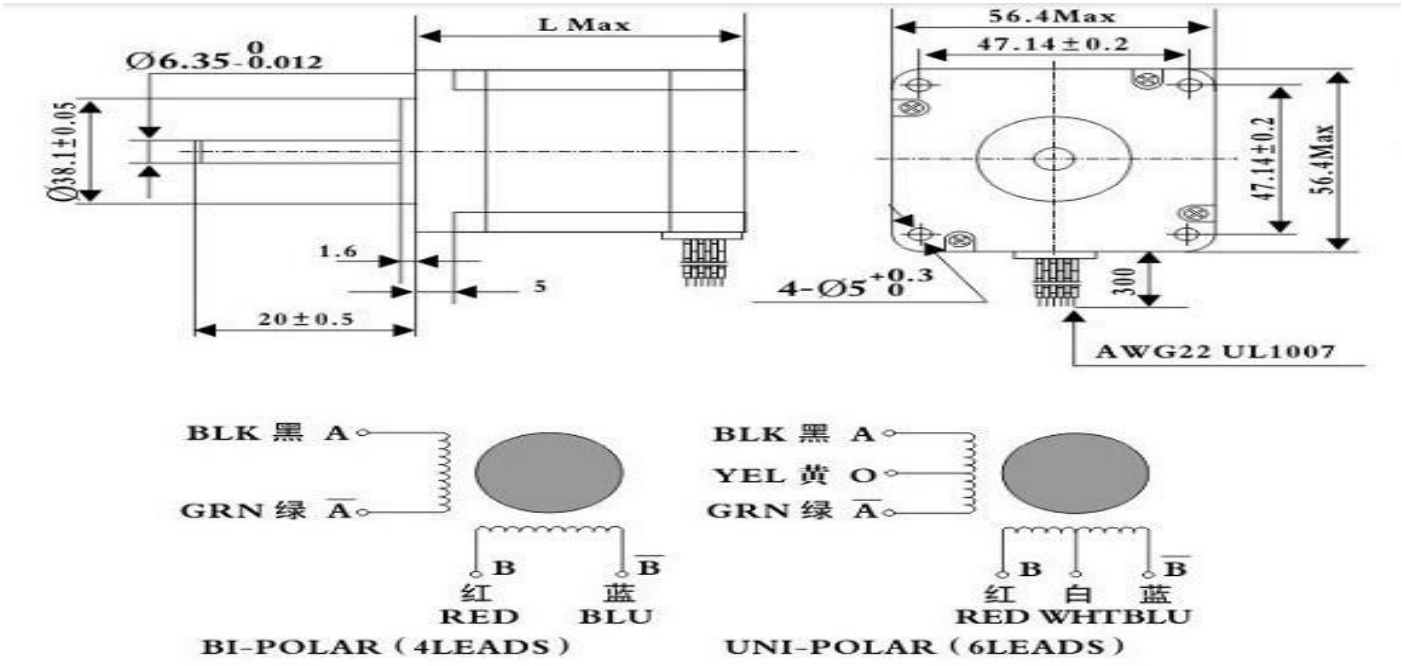
| Current Setting | SW1 | SW2 | Decay Mode Settings | SW3 | SW4 | MicroStep Settings | SW5 | SW6 |
|---|---|---|---|---|---|---|---|---|
| 100% | ON | ON | FAST | ON | ON | 1 | ON | ON |
| 75% | OFF | ON | 25% | ON | OFF | 1/2 | ON | OFF |
| 50% | ON | OFF | 50% | OFF | ON | 1/8 | OFF | OFF |
| 25% | OFF | OFF | SLOW | OFF | OFF | 1/16 | OFF | ON |

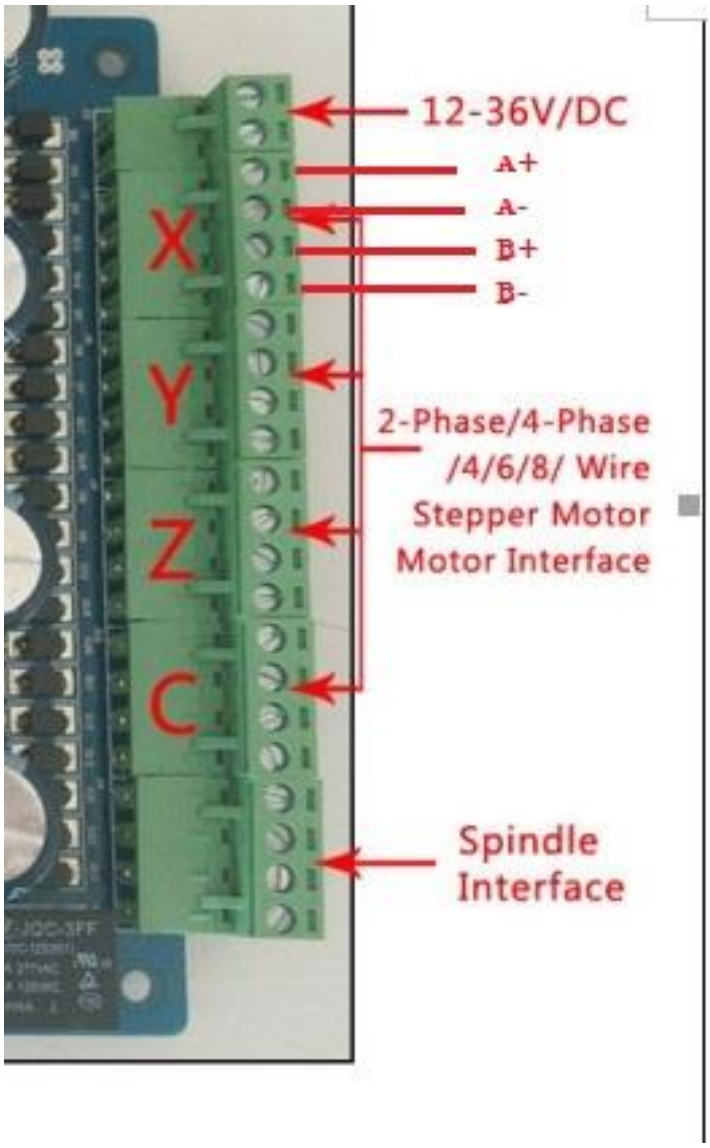
# STEPPER MOTORS



## Specification of Nema 57HS51254 Stepper Motor:

| Model | Step Angle | Rated Current | Phase Resistance | Phase Inductance | Holding Torque | Detent Torque | Rotor Inertia | Motor Length L | Lead Wire |
|---|---|---|---|---|---|---|---|---|---|
| | (°) | (A) | (Ω) | (MH) | (N.m) | (N.cm) | (g.cm²) | (mm) | (No.) |
| 57HS41204 | 1.8 | 2 | 1.2 | 2.5 | 0.55 | 2.5 | 150 | 41 | 4 |
| 57HS51064 | 1.8 | 0.62 | 13 | 28 | 1.1 | 2.8 | 190 | 51 | 4 |
| 57HS51254 | 1.8 | 2.5 | 1.2 | 3.2 | 1.1 | 2.8 | 190 | 51 | 4 |
| 57HS56304 | 1.8 | 3 | 0.8 | 2.4 | 1.2 | 3.5 | 280 | 56 | 4 |
| 57HS76304 | 1.8 | 3 | 1 | 3.5 | 1.8 | 6 | 440 | 76 | 4 |
| 57HS100424 | 1.8 | 4.2 | 0.8 | 3 | 2.5 | 10 | 680 | 100 | 4 |
| 57HS112424 | 1.8 | 4.2 | 1.4 | 1.8 | 3 | 12 | 800 | 112 | 4 |
| | | | | | | | | | |






**Method of connecting right motor wire to TB6560 driver board.**

Note:

1. Check the wiring carefully before truning on power, or the chip may be burned.

2. The current setted should not be more than the rated current.