

TST60 Integrated Closed loop Stepper Motor

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1. Product Introduction

Thank you for choosing the TST60 series integrated motor products. The TST60 series integrated motors are a perfect combination of drivers and stepper motors. They perfectly integrate stepper motor and drive technologies, which can not only save installation space but also simplify wiring, saving you design and production costs. It is your first choice when using stepper system solutions. The TST60 series products have the excellent characteristics of integrating control and drive.

1.1 Product Features

※Operating Voltage: DC24V~DC50V

※Drive Output Current: 0.2A~5A

※Control Mode: Pulse + Direction

※Encoder Mode: 1000 Lines

※Output Torque: 0.2NM~4.5NM

※Communication Method: TTL

※3 digital inputs, high level can directly receive 3.3~24V DC level, maximum frequency 300KHZ, 1 group of independent digital output, collector OC output, maximum withstand voltage 30V, maximum sink or output current 50mA

1.2 Safety Instructions

※The transportation, installation, use or maintenance of this product must be carried out by personnel with professional qualifications and familiar with the above operations.

※In order to minimize potential safety hazards, you should follow all local and national safety codes when using this equipment. Different regions have different safety regulations, and you should ensure that the installation and use of the equipment comply with the regulations in your location.

※System errors may also cause equipment damage or personal injury. We do not guarantee that this product is suitable for your specific application, nor can we assume responsibility for the reliability of your system design.

※Please be sure to read all relevant documentation before installation and use. Incorrect use may cause equipment damage or personal injury. Please strictly follow the relevant requirements before installation.

※Please be sure to confirm the grounding of all equipment in the system. Non - grounded systems cannot ensure electrical safety.

※Some components inside the equipment may be damaged by external static electricity. Operators should confirm that they are free of static electricity before contacting the product, avoid contacting objects prone to static electricity (such as chemical fibers, plastic films, etc.), and place items on a conductive plane.

※If your equipment is placed in a control cabinet, please close the outer cover or door of the control cabinet during operation, otherwise it may cause equipment damage or personal injury.

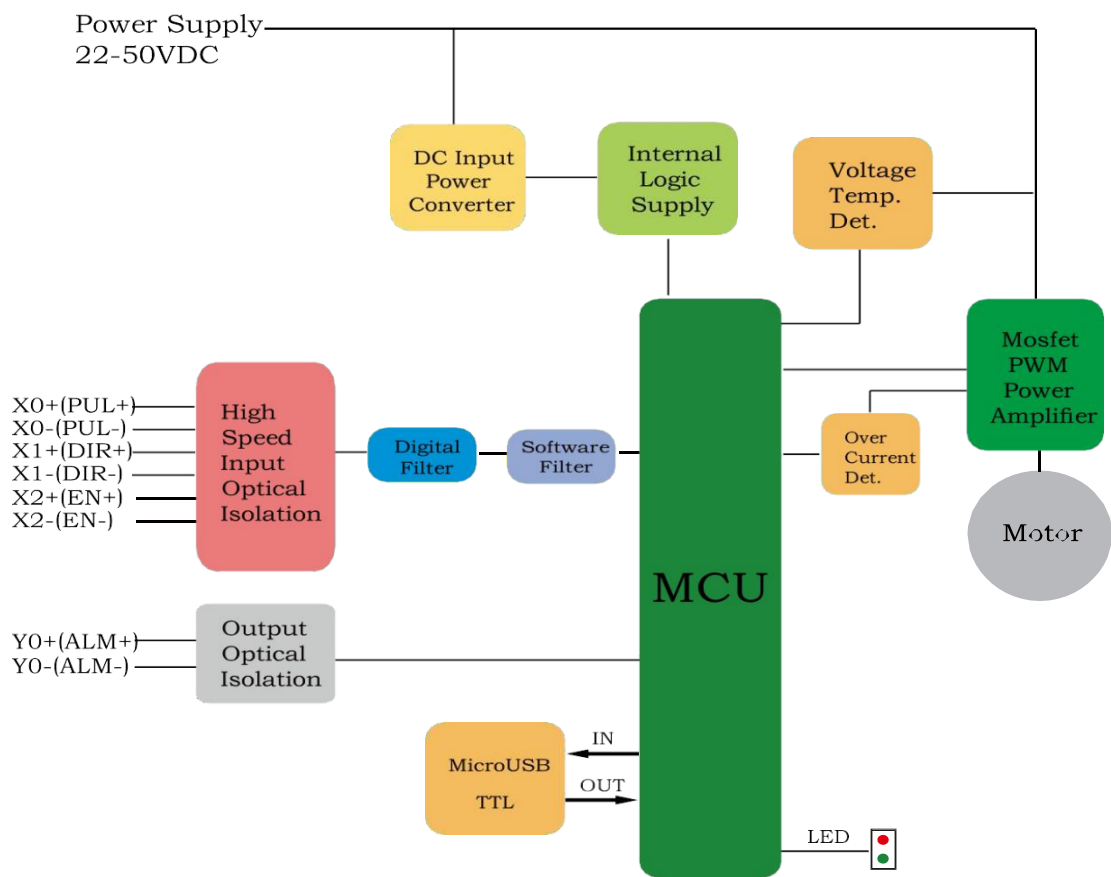
※During operation, depending on the protection level of surrounding equipment, the product may completely fail or the surface may generate a lot of heat. Even when the motor is not running, the power supply and control cables may still carry a high voltage.

※It is strictly forbidden to hot - swap cables when the system is running. The arc generated by hot - swapping may cause harm to both operators and equipment.

※Please wait at least ten seconds after powering off before touching or removing the wiring. Capacitive components may still store dangerous electrical energy after power off and need a certain time to discharge. To ensure safety, you can use a multimeter to measure before contacting the product.

※Please follow the safety instructions in this manual, including the clear warning signs for potential safety hazards. Read and familiarize yourself with these instructions before installation, operation and maintenance. The purpose of this text is to inform users of the necessary safety instructions and reduce the risk of hazards and personal injury. Misjudgment of the importance of safety precautions may cause serious losses or make the equipment unable to be used normally.

2.Product Structure Block Diagram

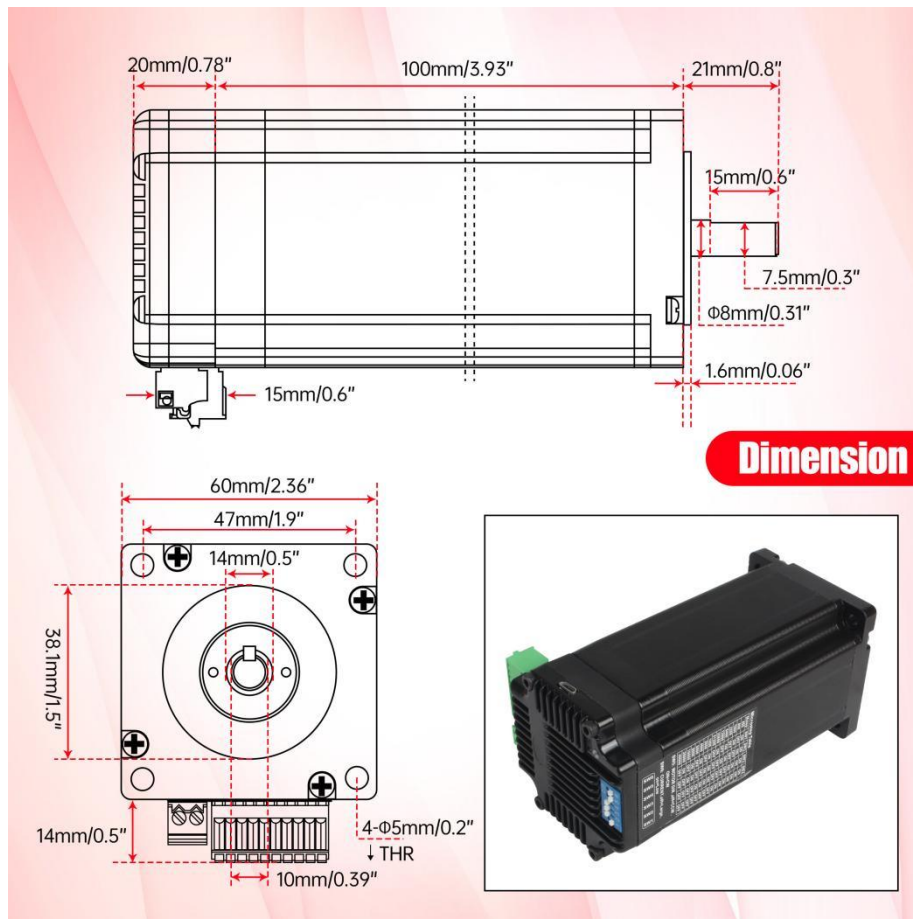


3、驱动参数及产品选型

Model	Voltage	Current	Input	Output	Communication Method	Communication Interface	Working Mode
TST60-65P	24-48 VDC	5A	3.3~24V compatible	Maximum withstand voltage 30V50MA	TTL	MicroUSB	Pulse + Direction
TST60-86P							
TST60-100P							
TST60-112P							

Model	Body Length	Shaft Length	Shaft Diameter	Phase Current	Phase Resistance	Phase Inductance	Holding Torque	Moment of Inertia	Weight
	mm	mm	mm	A	Ω	mH	N.M	G.cm ²	g
TST60-65P	85	21	8	5	0.5	1.5	1.8	280	600
TST60-86P	106	21	8	5	0.4	2.0	2.6	480	800
TST60-100P	120	21	8	5	0.6	2.5	3.5	680	1000
TST60-112P	132	21	8	5	0.7	3.2	4.5	780	1200

4. Product Schematic and Mechanical Installation Drawings



5. Preparations Before Start

5.1 You need to prepare the following:

- ※A 24~48V DC power supply
- ※A personal computer with a Microsoft Windows operating system installed;
- ※A matching MicroUSB data cable

5.2 Hardware Installation:

The installation environment of any model of TST60 integrated motor must have good heat dissipation conditions and air circulation. Sufficient space must be left around the TST60 integrated motor to ensure air convection.

※Do not use in an environment without air convection and where the ambient temperature exceeds 40°C.

※Do not use in a humid environment.

※Do not use in an environment that may cause circuit short - circuit.

6. Connecting the Power Supply:

6.1 Selecting the Power Supply Voltage

When selecting a power supply, the most important thing is to reasonably consider the voltage and current requirements in the actual application. The TST60 integrated motor performs best when powered by a 36V DC voltage. The allowable maximum operating voltage range is 22VDC~50VDC. When the DC voltage supply of TST60 is lower than 24V, it is recommended to connect a large voltage - stabilizing capacitor in parallel at the power input end to prevent the driver from low - voltage alarm due to unstable power supply voltage. In addition, the voltage - stabilizing capacitor can also absorb the current spikes on the power line to prevent the driver from false protection. When the driver is powered by a regulated power supply and the supply voltage is close to 50VDC, it is recommended to take voltage clamping measures at the power input end to avoid the driver from overvoltage alarm and stopping working due to the supply voltage being higher than 50VDC. When the driver is powered by an unregulated power supply, please ensure that the no - load output voltage value of the power supply does not exceed 50VDC.

6.2 Selecting the Power Supply Current

Generally, the input current of the driver power supply is smaller than the current of the driving motor. This is because the driver itself realizes the power conversion function, that is, the driver amplifies and converts a high - voltage low - current signal into a low - voltage high - current signal through a power switch. The rated voltage of the motor winding is often very small. When the supply voltage of the driver is higher than the rated voltage of the motor

winding, the input current of the driver power supply is smaller. At the same time, the magnitude of the power input current is also related to the speed and load of the motor during operation. Therefore, for specific application scenarios, users need to carry out specific analysis and estimation.

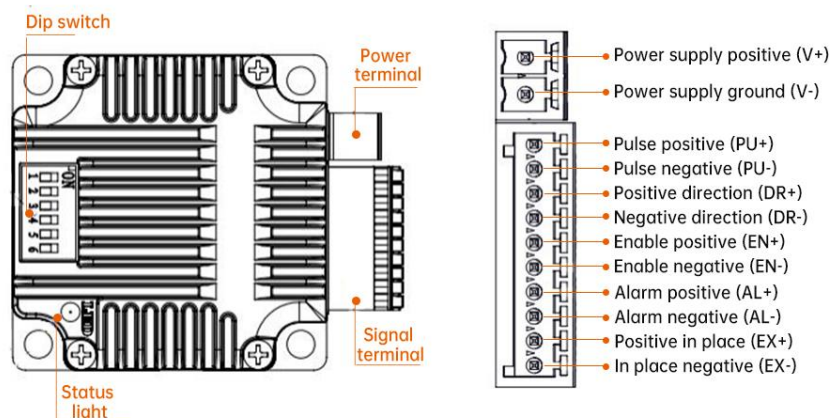
7. Installation and Wiring:

7.1 Connecting the Power Supply

It is recommended to use AWG20~24 gauge wires to connect the TST60 and the power supply. Connect the "+" terminal of the power supply to the port marked "V+" on the TST60, and connect the "-" terminal of the power supply to the port marked "V-" on the TST60. The TST60 has a fuse connected in series at the positive input of the power supply internally, but this fuse cannot be replaced by the user. Users can also connect another 5A fast - blow fuse in series at the positive pole of the power supply (externally) to achieve replaceable fuses.

7.2 Inputs and Outputs

PRODUCT DIAGRAM



7.2 Input and Output

The TST60 integrated stepper motor has 3 high-speed input signals, and can directly receive 3.3-24V DC level at high level, with a maximum of

Frequency 300KHZ. The following are detailed functional descriptions of these input and output signals:

X0/PUL available input function pulse input

X1/DIR available input function direction input

- X2/ENABLE input function enables input

The output functions available for YO/ALM include alarm output, universal output, and factory default alarm output.

7.3 Connector Pin Definitions

Serial Number	Name	Function
1	V+	Power supply positive (DC24V~48V)
2	V-	Power supply negative
3	PUL+	Optical isolation, differential, high level can directly receive 3.3 - 24VDC, minimum pulse width 2us, maximum pulse frequency 300KHz, default as pulse input port
4	PUL-	
5	DIR+	Optical isolation, differential, high level can directly receive 3.3 - 24VDC, minimum pulse width 2us, maximum pulse frequency 300KHz, default as direction signal input port
6	DIR-	
7	EN+	Optical isolation, differential, high level can directly receive 3.3 - 24VDC, minimum pulse width 100us, maximum pulse frequency 10KHz, default as enable input port
8	EN-	
9	ALM+	Alarm status output port, which can detect the alarm status of the motor, normally closed by default, and output when normal. Can be inverted by software or set to other functions.
10	ALM-	

8. DIP Switch Settings

7.1 Subdivision Settings

Mstep	SW1	SW2	SW3	SW4
400	ON	ON	ON	ON
800	OFF	ON	ON	ON
1600	ON	OFF	ON	ON
3200	OFF	OFF	ON	ON
6400	ON	ON	OFF	ON
12800	OFF	ON	OFF	ON
25600	ON	OFF	OFF	ON
51200	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
40000	OFF	OFF	OFF	OFF

8.2 Running Direction Settings

SW5 is used to set the running direction of the motor. When it is OFF, the motor rotates counterclockwise; when it is ON, the motor rotates clockwise.

9. TTL Communication Parameters

1. Baud rate: default 9600;
2. Data bits: 8 bits;
3. Stop bits: 1 bit;
4. Parity bit: none.

10. Alarm

TST60 uses a dual - color patch LED (red/green) to display the status. The normal status is that the green LED flashes. If the red LED flashes, it indicates an alarm or an error has occurred.