

DM

Stepper Motor Driver

DM542 V2.0

MicroSteps Setting:400~25600

DC: 24~50V

Overview

- The latest 32-bit digital processing technology
- Optically isolated differential signal input
- Ultra low vibration noise
- Built-in micro-segmentation
- Easy current setting, can be switched between 0.7~4.2A
- Integrated parameter power-on auto-tuning function
- Subdivision setting (400~25600)
- With overcurrent, overvoltage, undervoltage protection

Features

Input voltage	24~50VDC
Output current	0.7~4.2A (PEAK)
Pulse frequency	0~100KHz
MicroSteps	16 MicroSteps
Using environment	Avoid high temperatures, oil mist, dust, corrosive gases
Storage environment	-20~+65°C, avoid direct sunlight

The drive power supply DC power supply is universal, the DC power supply range is 24~50VDC, and the DC power supply has positive and negative power supply anti-reverse connection functions.

The characteristic of the output torque

- 1) The larger the actual current of the motor, the greater the output torque, but the more copper loss ($P=I^2R$) of the motor, the more heat the motor generates;
- 2) The higher the supply voltage of the driver, the higher the high-speed torque of the motor;
- 3) It can be seen from the moment frequency characteristic diagram of the stepping motor that the high speed is smaller than the medium and low speed torque.

Strengthen the heat dissipation method

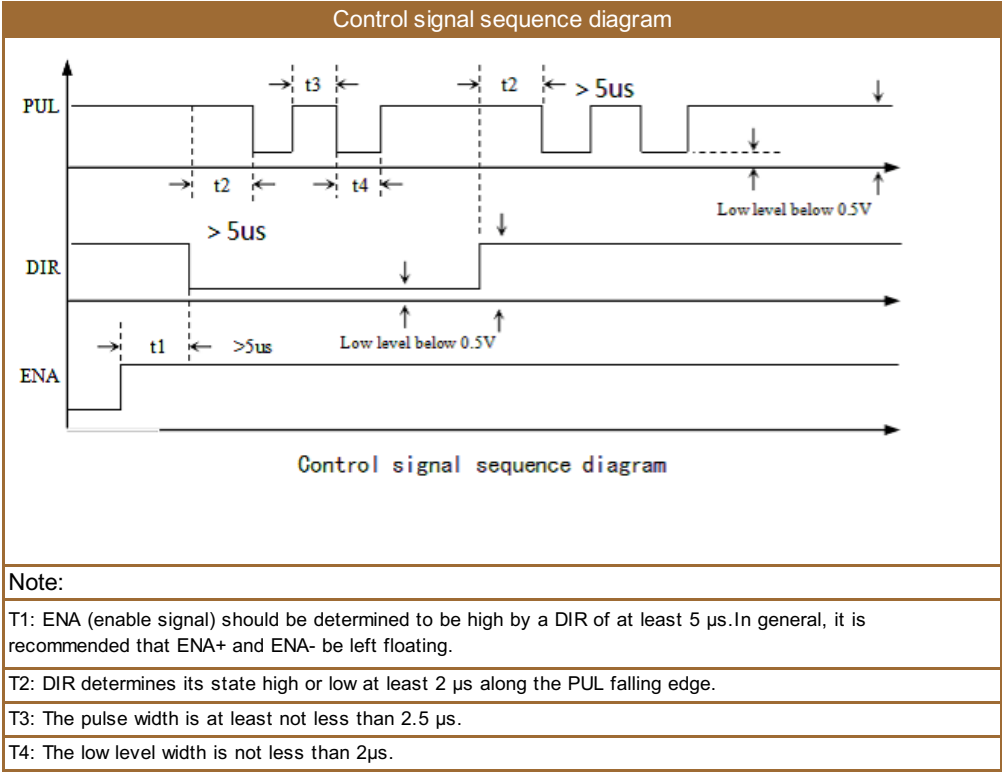
- 1) The reliable operating temperature of the driver is usually within 60 ° C, and the motor operating temperature is within 80 ° C;
- 2) Select the automatic semi-flow mode when using, the current will be automatically reduced by half when the motor stops, to reduce the heat of the motor and the drive;
- 3) When installing the driver, please install it on the vertical side to make the heat dissipating teeth form a strong air convection; if necessary, install a fan near the driver to force heat dissipation to ensure the driver works within the reliable working temperature range.

Motor and power

Symbol	Name	Remark
A+	Phase A+	
A-	Phase A-	
B+	Phase B+	
B-	Phase B-	
DC+	input power +	24~50V
DC-	input power -	GND

Control signal

Symbol	Name	Remark
PUL+	Pulse signal +	/
PUL-	Pulse signal -	/
DIR+	Direction signal+	/
DIR-	Direction signal-	/
ENA+	Enable signal +	Only connected when used
ENA-	Enable signal -	Only connected when used



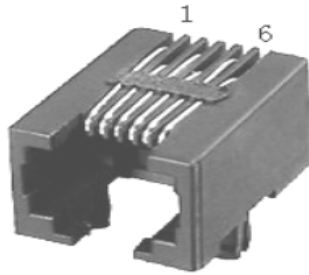
LED status indication	
Drive working status	Symptom
Overcurrent Protection	
Overvoltage protection	
Undervoltage protection	
Phase loss protection	

DIP switch setting				
SW1	SW2	SW3	PEAK	RMS
ON	ON	ON	1.00A	0.71A
OFF	ON	ON	1.46A	1.04A
ON	OFF	ON	1.92A	1.36A
OFF	OFF	ON	2.37A	1.69A
ON	ON	OFF	2.84A	2.03A
OFF	ON	OFF	3.32A	2.36A
ON	OFF	OFF	3.76A	2.69A
OFF	OFF	OFF	4.20A	3.00A

SW4: The quiescent current can be set by the SW4 dial switch. OFF means that the quiescent current is set to half of the dynamic current. ON means that the quiescent current is the same as the dynamic current. In general use, SW4 should be set to ON, so that the heat generated by the motor and the driver is reduced, and the reliability is improved. After about 30ms, the current is automatically reduced to about half (60% of the actual value), and the calorific value is theoretically reduced to 30%.

Microsteps setting																
RPM	Default	400	800	1600	3200	6400	12800	25600	1000	2000	4000	5000	8000	10000	20000	25000
SW5	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
SW6	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF
SW7	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF
SW8	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Communication port



Terminal number	symbol	name	Description
1	NC		
2	+5V	Positive power terminal	External STU only
3	TxD	Sending end	
4	GND	Power ground	0V
5	RxD	Receiving end	
6	NC		

Output current setting value

For the same motor, the larger the current setting value, the larger the motor output torque, but the heat of the motor and the driver is also more serious when the current is large. The magnitude of the specific heat generation is not only related to the current set value, but also to the type of exercise and the dwell time. The following setting method uses the rated current value of the stepping motor as a reference, but the optimum value in practical applications should be adjusted based on this. In principle, if the temperature is very low (<40 °C), the current setting value can be appropriately increased to increase the motor output power (torque and high-speed response).

1) Four-wire motor: The output current is set to be equal to or slightly smaller than the rated current of the motor;

2) Six-wire motor high torque mode: the output current is set to 50% of the rated current of the motor unipolar connection;

3) Six-wire motor high-speed mode: the output current is set to 100% of the rated current of the motor unipolar connection;

4) Eight-wire motor series connection method: the output current can be set to 70% of the rated current of the motor unipolar connection;

5) Eight-wire motor and connection method: The output current can be set to 140% of the rated current of the motor unipolar connection.

Wiring requirements

1) In order to prevent the driver from being disturbed, it is recommended to use the shielded cable for the control signal, and the shield layer is shorted to the ground wire. Unless otherwise specified, the shielded cable of the control signal cable is grounded at one end: the upper end of the shielded wire is grounded, and the shielded wire The drive is suspended at one end. Only the grounding at the same point is allowed in the same machine. If it is not a real grounding wire, the interference may be serious. At this time, the shielding layer is not connected.

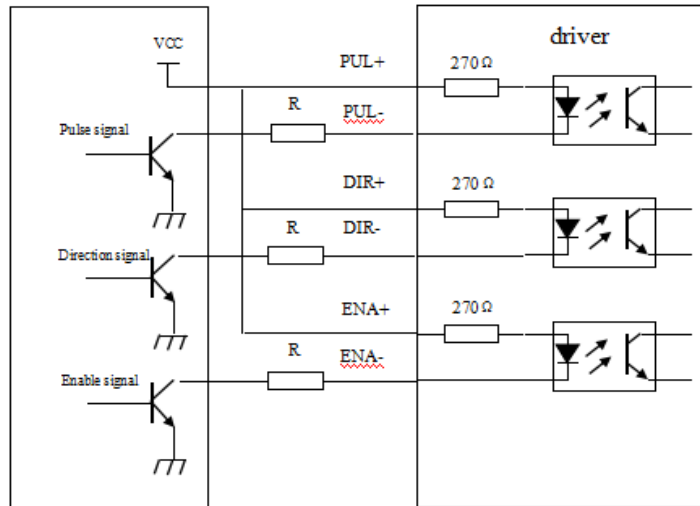
2) The pulse and direction signal lines and the motor lines are not allowed to be bundled side by side, preferably separated by at least 10 cm. Otherwise, the motor noise easily interferes with the pulse direction signal, causing the motor to be inaccurately positioned, and the system is unstable.

3) If one power supply is provided for multiple drives, parallel connections should be made at the power supply. It is not allowed to connect one to the other and then to another chain.

4) It is forbidden to electrify the P2 terminal of the driver. When the charged motor stops, there is still a large current flowing through the coil. Pulling the P2 terminal will cause a huge moment to induce the electromotive force to burn the driver.

5) It is strictly forbidden to add the tin to the terminal after adding the tin, otherwise the terminal may be overheated due to the contact resistance becoming larger.

Control Signal Connection



Common anode connection

The DM542 driver uses a differential interface circuit for differential signals, single-ended common cathode and common anode interfaces, and a built-in high-speed optocoupler that allows reception of long-line drivers, open-collector and PNP output circuits. In the harsh environment, we recommend Long-line driver circuit with strong anti-interference ability.

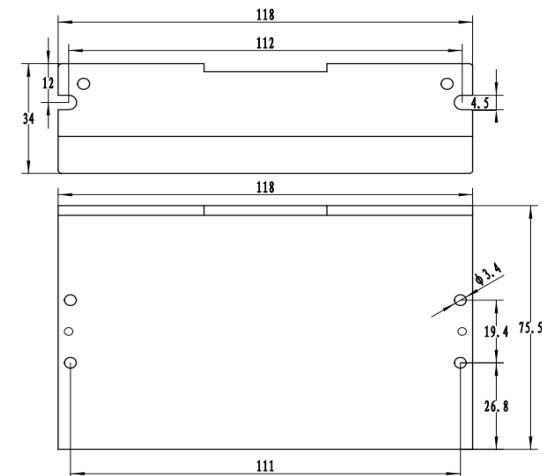
Power supply

The power supply voltage can work normally within the specified range. The DM542 driver is preferably powered by an unregulated DC power supply, or a transformer buck + bridge rectifier + capacitor filter. Note, however, that the rectified voltage ripple value should not exceed its specified maximum voltage. It is recommended that the user supply power with a DC voltage below the maximum voltage to avoid grid fluctuations exceeding the driver voltage range.

If using a regulated switching power supply, it should be noted that the output current range of the switching power supply should be the largest.

- 1) Pay attention to the power supply when wiring, do not reverse
- 2) It is best to use an unregulated power supply
- 3) When using unregulated power supply, the power supply current output capability should be greater than 60% of the drive set current.
- 4) When using a regulated switching power supply, the output current of the power supply should be greater than or equal to the operating current of the driver.
- 5) In order to reduce costs, two or three drives can share one power supply.

Drive Dimensional Chart(mm)



Note: It is recommended to use side mounting for better heat dissipation. When designing the mounting dimensions, pay attention to the terminal size and wiring!

ACT MOTOR GmbH

Problems and handle the law		
Problem	Reason	Solution
The motor does not run	Power light is not lit	Check the power supply circuit, normal power supply
	Motor shaft is powerful	The pulse signal is weak and the signal current is increased to 7-16mA.
	Subdivision is too small	Selective segmentation
	Current setting is too small	Selective current
	Drive is protected	Power on again
	Enable signal is low	This signal is pulled high or not
	Does not respond to control signals	No power
Motor steering error	Motor line is wrong	Any two wires of the same phase of the exchange motor (A+ A-exchange position)
	The motor line has an open circuit	Check and pick up
Alarm indicator is on	Motor line is wrong	Check wiring
	Voltage is too high or too low	Check the power supply
	Motor or drive damage	Replace the motor or drive
Inaccurate location	Signal interference	Eliminate interference
	The shield is not connected or not connected	Reliable grounding
	The motor line has an open circuit	Check and pick up
	Subdivision error	Set the subdivision
	Small current	Increase current
Stall when the motor accelerates	Acceleration time is too short	Accelerated acceleration time
	Motor torque is too small	Select a large torque motor
	Low voltage or too small current	Appropriately increase the voltage or current