

STEPPERONLINE DM556T

STEPPERONLINE DM556T Digital Stepper Driver User Manual

Model: DM556T

1. INTRODUCTION

The STEPPERONLINE DM556T is a fully digital stepper drive developed with advanced DSP control algorithms. It is designed to drive 2-phase and 4-phase hybrid stepper motors, specifically Nema 23 and Nema 24 motors. This manual provides detailed instructions for the proper installation, configuration, and operation of the DM556T stepper driver, ensuring optimal performance and longevity.

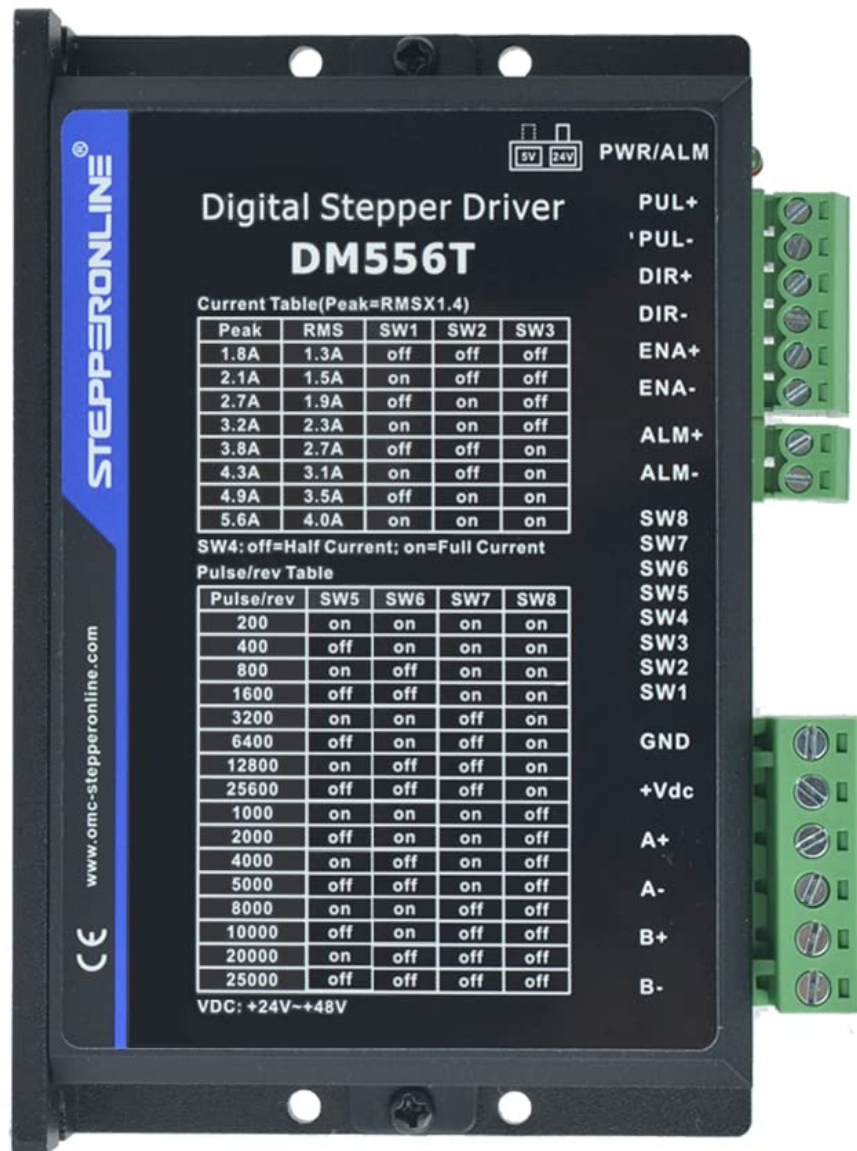


Figure 1: Front view of the STEPPERONLINE DM556T Digital Stepper Driver, showing terminal blocks and DIP switches.

2. FEATURES

- High-quality construction for reliable performance.
- Manufactured by Leadshine, ensuring professional-grade performance.
- Compatible with Nema 23 and Nema 24 stepper motors.
- Anti-Resonance provides optimal torque and nulls mid-range instability.
- Motor Auto-identification and parameter Auto-configuration technology, offers optimal responses with different motors.
- Multi-Stepping allows a low resolution step input to produce a higher microstep output for smooth motor performance.
- Soft-start with no 'jump' when power on.
- Input voltage 20-50VDC.
- Output current 1.8-5.6A.

- Pulse input frequency up to 200 KHz.
- TTL compatible and optically isolated input.
- Automatic idle-current reduction.
- Supports PUL/DIR and CW/CCW modes.
- Over-voltage, over-current, phase-error protection.

3. SPECIFICATIONS

3.1 Electrical Specifications

Electrical Specifications

Parameters	DM556T			
	Min	Typical	Max	Unit
Output Current	1.8	-	5.6(4.0RMS)	A
Supply Voltage	20	24 - 48	50	VDC
Logic Signal Current	7	10	16	mA
Pulse input frequency	0	-	200	kHz
Minimal pulse width	2.5	-	-	uS
Minimal direction setup	5.0	-	-	uS
Isolation resistance	500			MΩ

Operating Environment and other Specifications

Cooling	Natural Cooling or Forced cooling	
Operating Environment	Environment	Avoid dust, oil fog and corrosive gases
	Ambient Temperature	0°C — 65°C
	Humidity	40%RH—90%RH
	Operating Temperature	0°C - 50°C (32°F - 122°F)
	Vibration	10 - 50Hz / 0.15mm
Storage Temperature	-20° C - 65° C (-4° F - 149° F)	
Weight	Approx. 300g (10.6oz)	

Figure 2: Electrical specifications for the DM556T driver, including output current, supply voltage, logic signal current, pulse input frequency, and minimal pulse width.

3.2 Operating Environment and Other Specifications

Category	Parameter	Value
Cooling	Natural Cooling or Forced Cooling	
	Environment	Avoid dust, oil fog, and corrosive gases
	Ambient Temperature	0°C — 65°C
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Vibration	10 - 50Hz / 0.15mm	
Storage Temperature	-20°C - 65°C (-4°F - 149°F)	
Weight	Approx. 300g (10.6oz)	

Category	Parameter	Value
Product Dimensions	1.33 x 1.33 x 2.97 inches (33.8 x 33.8 x 75.4 mm)	
Item Model Number	DM556T	
Manufacturer	Leadshine Technology Co., Ltd.	

3.3 Mechanical Specifications

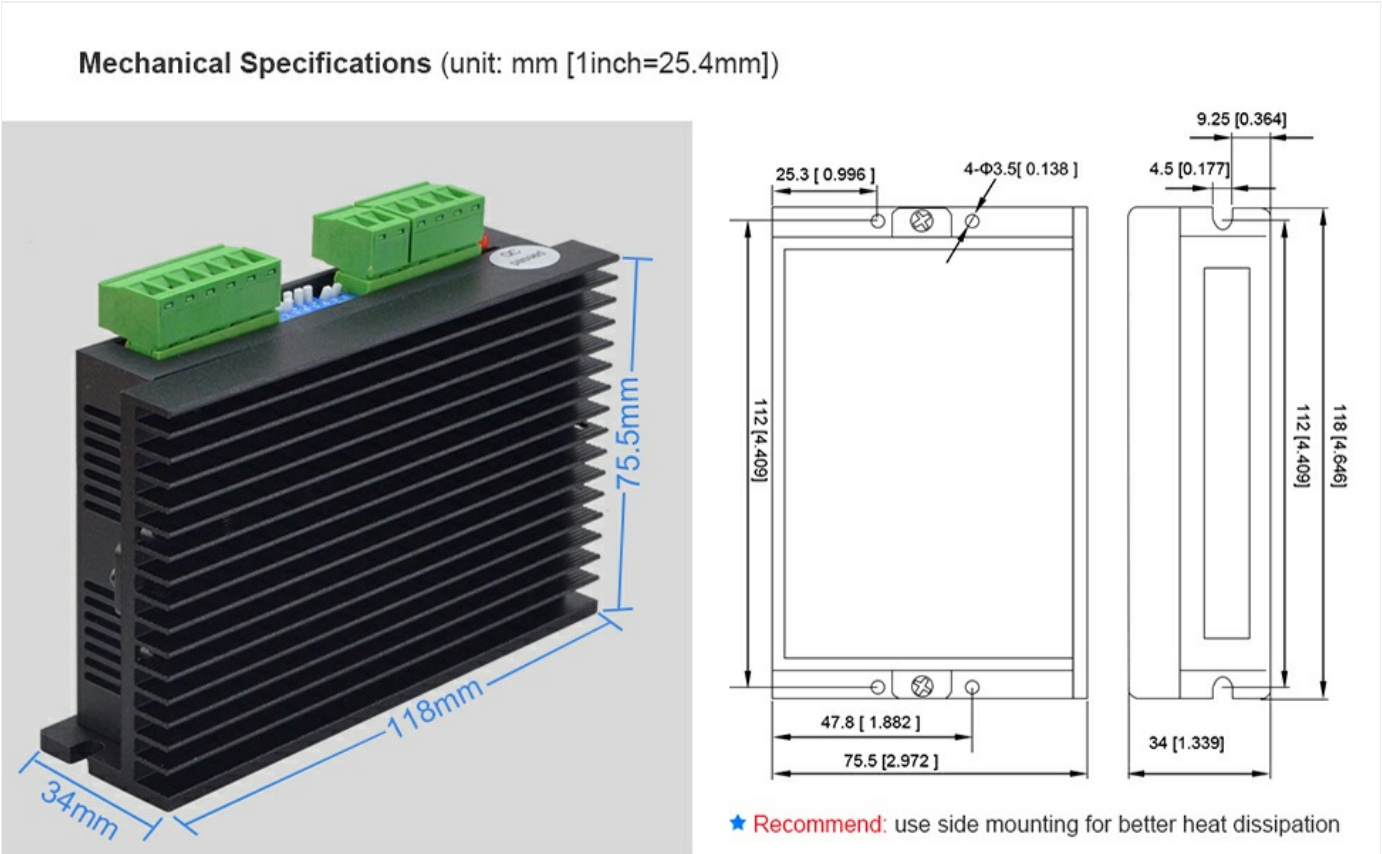


Figure 3: Mechanical dimensions of the DM556T driver. Side mounting is recommended for better heat dissipation.

4. SETUP AND INSTALLATION

4.1 Wiring Connections

The DM556T driver features clearly labeled terminal blocks for power, motor, and control signals. Ensure all connections are secure and correctly polarized to prevent damage to the driver or motor.

- **Power Supply (+Vdc, GND):** Connect a DC power supply within the 20-50VDC range. Observe polarity.
- **Motor Connections (A+, A-, B+, B-):** Connect the stepper motor phases to these terminals. For 2-phase motors, ensure correct phase matching.
- **Control Signals (PUL+, PUL-, DIR+, DIR-, ENA+, ENA-):** These are optically isolated inputs for Pulse, Direction, and Enable signals.
- **Alarm Output (ALM+, ALM-):** Provides an alarm signal in case of protection activation.



STEPPER DRIVER

Model	DM556T(V4.0)	DM556T
PIC	 The DM556T(V4.0) driver features a PIC control system. It includes a 6-pin terminal block for control signals (PUL+, PUL-, DIR+, DIR-, ENA+, ENA-) and a 6-pin terminal block for power and motor connections (A+, A-, B+, B-, GND, +Vdc). The driver has a 5/24V selector switch on top, currently set to 24V. The current table shows settings for 1.5A, 2.1A, 2.7A, 3.3A, 3.9A, 4.5A, and 5.1A. The pulse table shows settings for 200, 400, 800, 1600, 3200, 6400, 12800, 25600, 51200, 102400, 204800, and 409600 pulses per revolution.	 The DM556T driver features a PLC control system. It includes a 4-pin terminal block for control signals (PUL+, PUL-, DIR+, DIR-) and a 6-pin terminal block for power and motor connections (A+, A-, B+, B-, GND, +Vdc). The driver has a 5V selector switch on top. The current table shows settings for 1.5A, 2.1A, 2.7A, 3.3A, 3.9A, 4.5A, and 5.1A. The pulse table shows settings for 400, 800, 1600, 3200, 6400, 12800, 25600, 51200, 102400, 204800, and 409600 pulses per revolution.
Control Signal Voltage	5 / 24V selector on the top of driver, factory setting is 24V	5V, need to connect 2KΩ resistances if using 24V (PLC)
Digital Output	Alarm output	None
Connector	Input Signals: 6pin@3.81mm Output Signals: 2pin@3.81mm Power & Motor: 6pin@5mm	Input Signals: 4+2 pin@5mm Power & Motor: 6pin@5mm

Figure 5: Comparison table showing differences between DM556T(V4.0) and DM556T, including control signal voltage selection and digital output.

4.3 Mounting

Mount the DM556T driver in a location that allows for adequate heat dissipation. Side mounting is recommended to maximize cooling efficiency, especially in applications requiring continuous operation or high current settings. Ensure sufficient airflow around the heatsink fins.

5. OPERATING INSTRUCTIONS

The DM556T driver features an 8-bit DIP switch for configuring dynamic current, microstep resolution, and standstill current. Switches 1-3 control dynamic current, switch 4 controls standstill current, and switches 5-8 control microstep resolution.

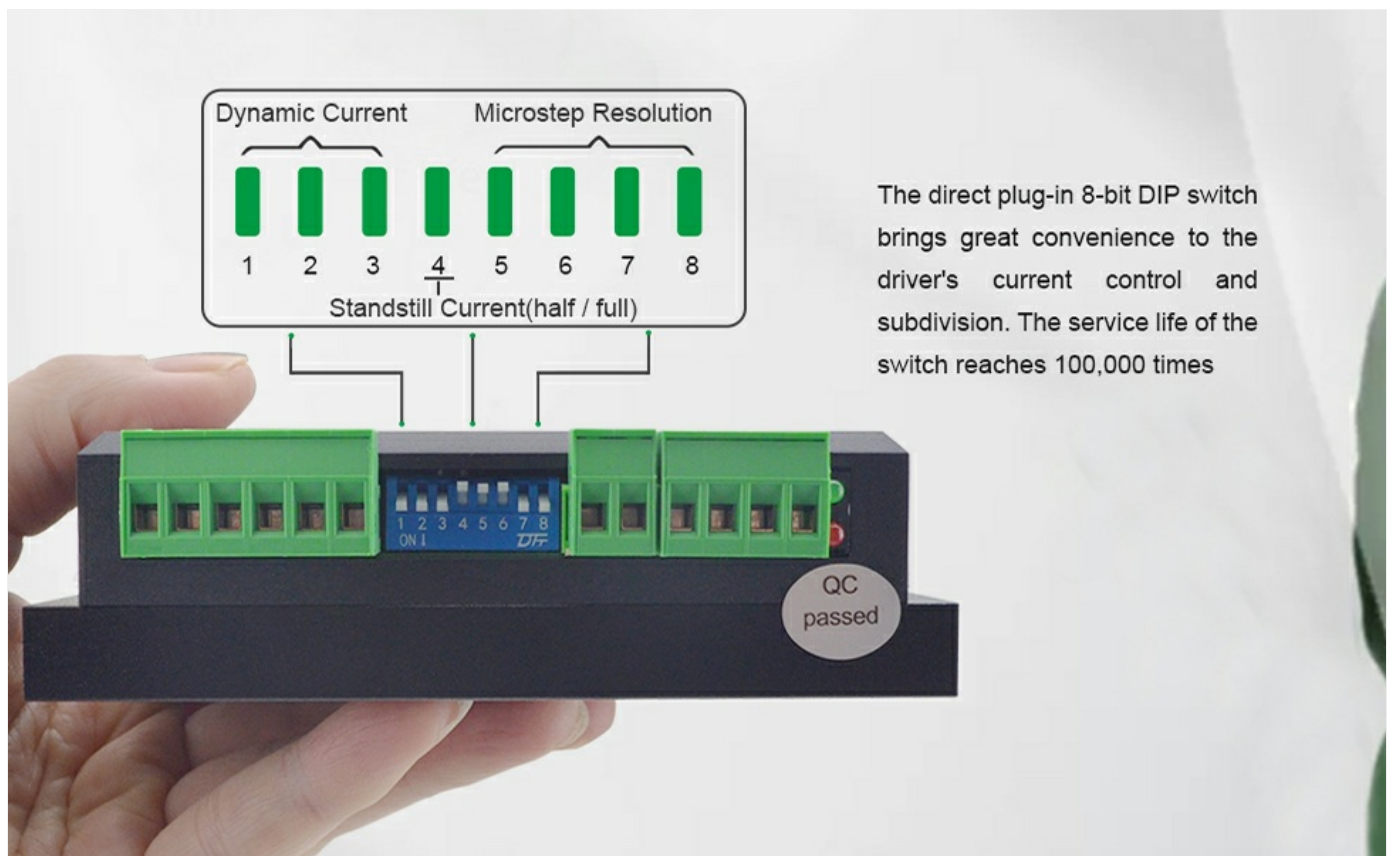


Figure 6: Diagram illustrating the function of each DIP switch for dynamic current, standstill current, and microstep resolution settings.

5.1 Current Setting (SW1, SW2, SW3)

Use DIP switches SW1, SW2, and SW3 to set the peak output current for the motor. Refer to the table below for specific current values based on switch positions. 'ON' typically corresponds to a lower value, and 'OFF' to a higher value, but always consult the table on the driver or in the diagram.

Peak Current (A)	RMS Current (A)	SW1	SW2	SW3
1.8	1.3	off	off	off
2.1	1.5	on	off	off
2.7	1.9	off	on	off
3.2	2.3	on	on	off
3.8	2.7	off	off	on
4.3	3.1	on	off	on
4.9	3.5	off	on	on
5.6	4.0	on	on	on

5.2 Microstep Resolution Setting (SW5, SW6, SW7, SW8)

Use DIP switches SW5, SW6, SW7, and SW8 to set the desired microstep resolution (pulses per revolution). This determines the smoothness of motor movement. Refer to the table below for specific settings.

Pulse/Rev	SW5	SW6	SW7	SW8
200	on	on	on	on

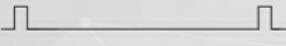
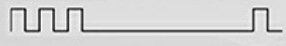
Pulse/Rev	SW5	SW6	SW7	SW8
400	off	on	on	on
800	on	off	on	on
1600	off	off	on	on
3200	on	on	off	on
6400	off	on	off	on
12800	on	off	off	on
25600	off	off	off	on
1000	on	on	on	off
2000	off	on	on	off
4000	on	off	on	off
5000	off	off	on	off
8000	on	on	off	off
10000	off	on	off	off
20000	on	off	off	off
25000	off	off	off	off

5.3 Standstill Current (SW4)

DIP switch SW4 controls the standstill current reduction. When SW4 is 'ON', the driver operates in half-current mode when the motor is idle. When 'OFF', it operates in full-current mode. Half-current mode reduces motor heating and power consumption during periods of inactivity.

Protection Functions

To improve reliability, the drive incorporates some built-in protection features.

Priority	Time(S) of Blink	Sequence wave of red LED	Description
1st	1		Over-current protection activated when peak current exceeds the limit.
2nd	2		Over-voltage protection activated when drive working voltage is greater than 60VDC
3rd	3		Reserved.



Power / Alarm Light

When above protections are active, the motor shaft will be free or the red LED blinks. Reset the drive by repowering it to make it function properly after removing above problems.

Figure 8: Table detailing the protection functions, corresponding red LED blink sequences, and their descriptions.

- **Over-current Protection:** Activated when the peak current exceeds the limit. The red LED blinks once.
- **Over-voltage Protection:** Activated when the drive working voltage is greater than 60VDC. The red LED blinks twice.
- **Reserved:** A third blink sequence is reserved for future protection features.

When any of these protections are active, the motor shaft will be free, and the red LED will blink. To reset the drive, remove the cause of the problem and then cycle the power to the unit.

7. TROUBLESHOOTING

This section provides guidance for diagnosing and resolving common issues encountered with the DM556T stepper driver.

Symptoms	Possible Problems
Motor is not rotating	No power
	Fault condition exists
Motor rotates in the wrong direction	The drive is disabled
	Motor phases may be connected in reverse
The drive is in fault	DIP switch current setting is wrong
	Something wrong with motor coil
Erratic motor motion	Control signal is too weak
	Control signal is interfered
	Wrong motor connection
	Something wrong with motor coil
Motor stalls during acceleration	Current setting is too small, losing steps
	Current setting is too small
	Motor is undersized for the application
	Acceleration is set too high
Excessive motor and drive heating	Power supply voltage too low
	Inadequate heat sinking / cooling
	Automatic current reduction function not being utilized
	Current is set too high

Figure 9: Troubleshooting guide listing common symptoms and their possible causes.

Symptoms	Possible Problems
Motor is not rotating	No power
	Fault condition exists
Motor rotates in the wrong direction	Motor phases may be connected in reverse
The drive is in fault	DIP switch current setting is wrong
	Something wrong with motor coil
Erratic motor motion	Control signal is too weak
	Control signal is interfered
	Wrong motor connection
Motor stalls during acceleration	Current setting is too small, losing steps
	Acceleration is set too high
Excessive motor and drive heating	Power supply voltage too low
	Inadequate heat sinking / cooling
	Current is set too high

8. MAINTENANCE

The DM556T stepper driver is designed for long-term reliability with minimal maintenance. However, adhering to the

following guidelines can help ensure its continued optimal performance:

- **Environmental Control:** Operate the driver within the specified ambient temperature and humidity ranges. Avoid environments with excessive dust, oil mist, or corrosive gases.
- **Cleaning:** Periodically inspect the driver for dust accumulation, especially on the heatsink fins. Use compressed air or a soft brush to gently remove dust, ensuring proper airflow for cooling.
- **Connection Integrity:** Regularly check all wiring connections (power, motor, control signals) to ensure they remain tight and free from corrosion. Loose connections can lead to intermittent operation or damage.
- **Cooling:** Ensure that the mounting location provides adequate ventilation. If operating in high-temperature environments or at high current settings, consider forced air cooling to prevent overheating.

9. WARRANTY AND SUPPORT

For warranty information and technical support, please contact STEPPERONLINE directly or refer to their official website. Ensure you have your product model number (DM556T) and purchase details available when seeking support.

ASK A QUESTION ABOUT THIS MANUAL

Ask about setup, troubleshooting, compatibility, parts, safety, or missing instructions. Manuals+ will review the question and use this page's manual context to help answer it.

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Anonymous

Email

you@example.com

After a successful submission, we securely hash the supplied account or form email before sending it to Microsoft Advertising for conversion attribution. [Privacy details](#).

Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

Submit question