STEPPERONLINE DM320T

STEPPERONLINE DM320T Digital Stepper Driver User Manual

Model: DM320T

1. INTRODUCTION

This manual provides comprehensive instructions for the installation, operation, and maintenance of the STEPPERONLINE DM320T Digital Stepper Driver. This driver is designed for use with Nema 8, 11, 14, 16, and 17 stepper motors, offering precise control with micro-step resolutions and adjustable current settings.
Please read this manual thoroughly before operating the device to ensure proper functionality and safety.
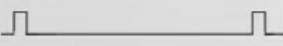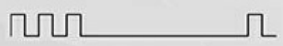
2. KEY FEATURES

- Industrial-grade stepper driver for reliable performance.
- Adjustable current output from 0.3A to 2.2A (peak).
- Micro-step resolutions up to 1/64 for smooth motor operation.
- Compatible with Nema 8, 11, 14, 16, and 17 stepper motors.
- Input voltage range: 10-30VDC.
- Built-in protection functions for over-current and over-voltage.

3. SPECIFICATIONS

3.1 Electrical Specifications

Protection Functions

To improve reliability, the drive incorporates some built-in protections 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 34VDC
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.

This image displays the electrical specifications for the DM320T driver, including output current (Min 0.3A, Max 2.2A Peak), supply voltage (10-30VDC), logic signal current (7-16mA), pulse input frequency (0-60kHz), minimal pulse width (7.5µs), minimal direction setup (7.5µs), and isolation resistance (100 MΩ).

3.2 Operating Environment and Other Specifications

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

This image details the operating environment and other specifications. It covers cooling requirements (natural or forced), ambient temperature (0°C to 65°C), humidity (40%-90%RH), operating temperature (0°C to 50°C), storage temperature (-20°C to 65°C), and weight (approx. 90g).

3.3 Mechanical Specifications
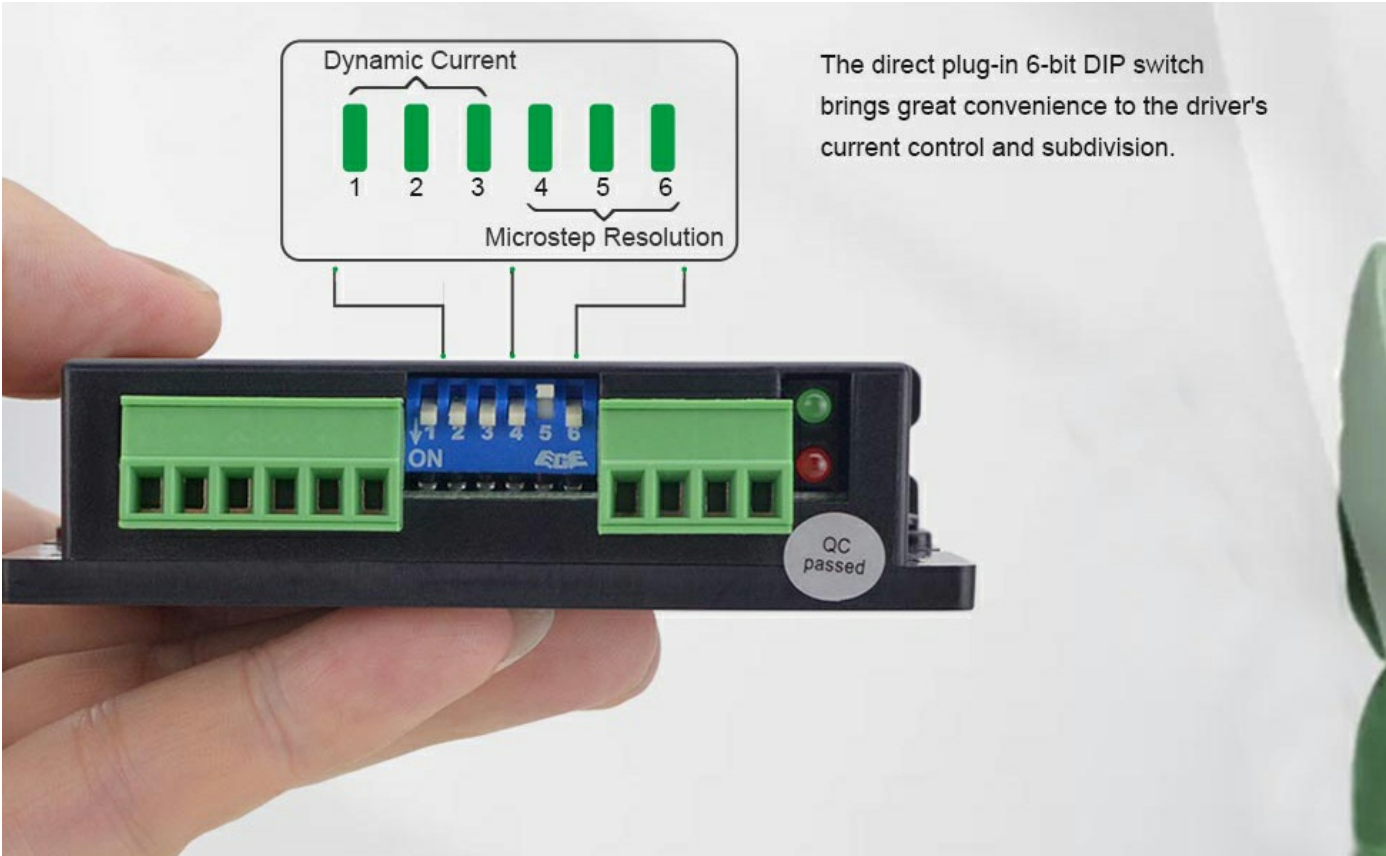
This image illustrates the mechanical dimensions of the DM320T driver, showing measurements in millimeters. It also recommends side mounting for improved heat dissipation.

4. SETUP AND WIRING

Proper wiring is crucial for the safe and effective operation of the DM320T driver. Ensure all connections are secure before applying power.

4.1 Driver Overview

PK Current Table

Peak	RMS	SW1	SW2	SW3
0.3A	0.21A	on	on	on
0.5A	0.35A	off	on	on
0.7A	0.50A	on	off	on
1.0A	0.71A	off	off	on
1.3A	0.92A	on	on	off
1.6A	1.13A	off	on	off
1.9A	1.34A	on	off	off
2.2A	1.56A	off	off	off

Pulse/rev Table

Pulse/rev	SW4	SW5	SW6
400	on	on	on
800	off	on	on
1600	on	off	on
3200	off	off	on
6400	on	on	off
12800	off	on	off
4000	on	off	off
8000	off	off	off

This image shows the top view of the DM320T driver, highlighting the DIP switches for current and micro-step settings, along with the terminal blocks for power, motor, and control signals.

4.2 Wiring Diagram Example
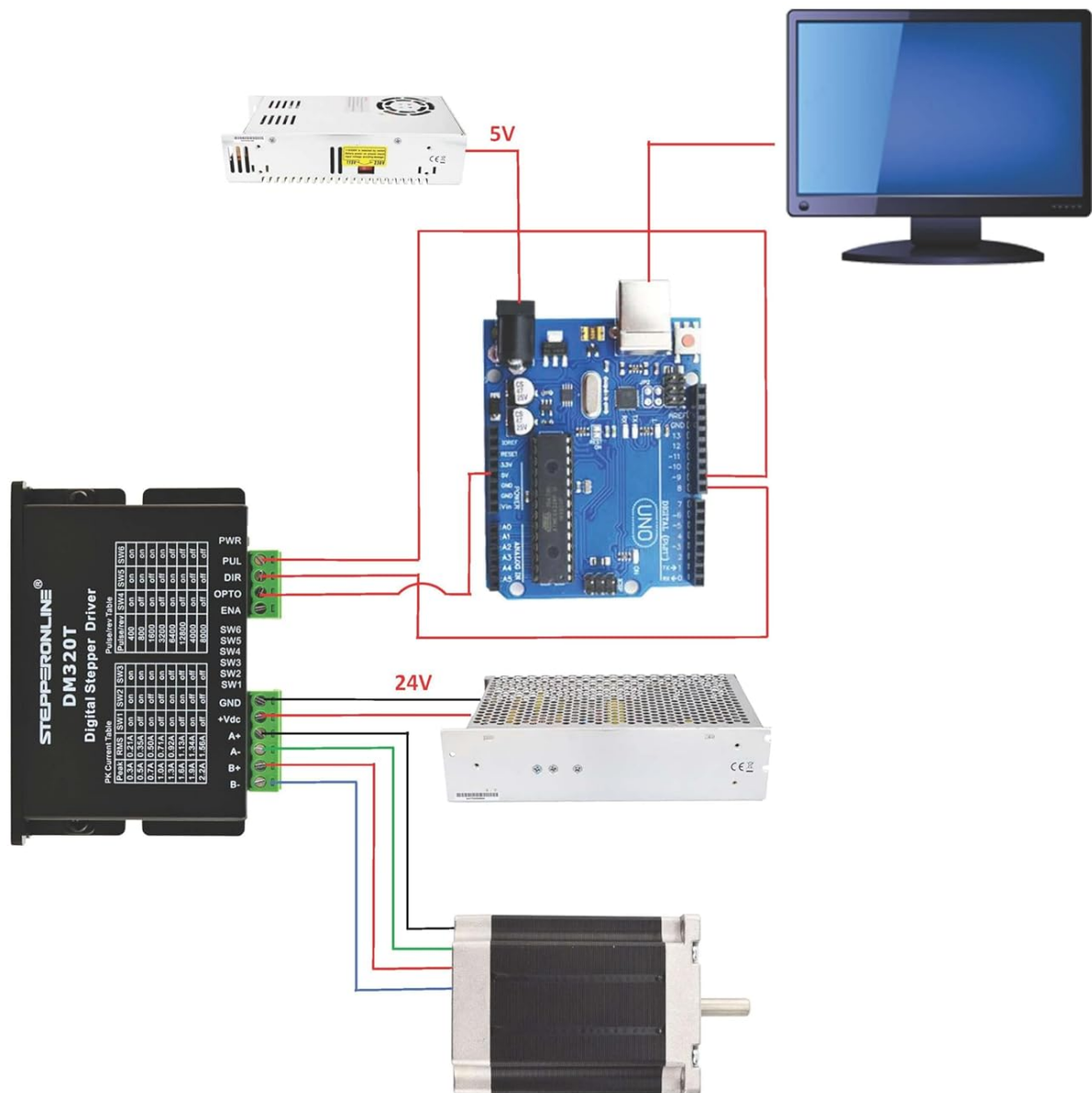
This diagram illustrates a typical wiring setup for the DM320T driver, connecting it to an Arduino board, a 24V power supply for the motor, a 5V power supply for the Arduino, and a stepper motor. Ensure correct polarity for power connections and proper signal routing for PUL (Pulse), DIR (Direction), and ENA (Enable) inputs.

4.3 Current and Micro-step Settings

The DM320T driver features a 6-bit DIP switch for configuring the output current and micro-step resolution. Switches SW1-SW3 control the peak current, and SW4-SW6 control the pulses per revolution (micro-step resolution).

Electrical Specifications

Parameters	DM320T			
	Min	Typical	Max	Unit
Output Current	0.3	-	2.2 (1.6 RMS)	A
Supply Voltage	10	24	30	VDC
Logic signal current	7	10	16	mA
Pulse input frequency	0	-	60	kHz
Minimal pulse width	7.5	-	-	uS
Minimal direction setup	7.5	-	-	uS
Isolation resistance	100			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 (32°F - 149°F)
	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. 90g (3.5 oz)	

This image shows the DIP switch configuration table. Refer to this table to set the desired peak current and micro-step resolution for your application. For example, setting SW1 'on', SW2 'off', SW3 'on' corresponds to a 1.0A peak current. Setting SW4 'on', SW5 'off', SW6 'on' corresponds to 1600 pulses/rev.

Important: Always adjust DIP switches when the power is off to prevent damage to the driver or motor.

5. OPERATION

After completing the wiring and setting the DIP switches, the driver is ready for operation.

- **Power On:** Apply power to the driver within the specified voltage range (10-30VDC).
- **Control Signals:** Provide pulse (PUL) and direction (DIR) signals from your controller (e.g., Arduino, PLC).
- **Enable (ENA):** The ENA input can be used to enable or disable the motor. By default, if unconnected, the driver is enabled. Connecting ENA to a high signal (e.g., +5V) will enable the driver, while a low signal or open circuit might disable it depending on the specific configuration. Some users report needing to explicitly connect ENA to +5V for operation.
- **Motor Movement:** The motor will move according to the pulse signals received. The direction is determined by the DIR signal.

For optimal performance, ensure your control signals are clean and within the specified logic signal current range.

6. MAINTENANCE

The DM320T driver is designed for low maintenance. However, periodic checks can extend its lifespan and ensure reliable operation:

- **Environmental Conditions:** Ensure the operating environment remains within the specified temperature and humidity ranges. Avoid dust, oil fog, and corrosive gases.
- **Cooling:** While the driver supports natural cooling, forced cooling (e.g., a fan) is recommended in applications with high current settings or limited airflow to prevent overheating.

- **Connections:** Periodically check all wiring connections for tightness and integrity. Loose connections can lead to intermittent operation or damage.
- **Cleaning:** Keep the driver free from dust and debris. Use a soft, dry cloth for cleaning.

7. TROUBLESHOOTING

This section provides solutions to common issues encountered during the operation of the DM320T driver.

This image presents a troubleshooting guide. It lists common symptoms such as motor not rotating, motor rotating in the wrong direction, erratic motor motion, motor stalling, and excessive heating, along with their possible causes and solutions.

Common Troubleshooting Scenarios

Symptom	Possible Problems
Motor is not rotating	No power; Fault condition exists; The drive is disabled.
Motor rotates in the wrong direction	Motor phases may be connected in reverse; DIP switch current setting is wrong.
The drive is in fault	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; Acceleration is set too high; Power supply voltage too low.
Excessive motor and drive heating	Inadequate heat sinking / cooling; Automatic current reduction function not being utilized; Current is set too high.

7.1 Protection Functions and Alarm Light

Mechanical Specifications

★ Recommend: use side mounting for better heat dissipation
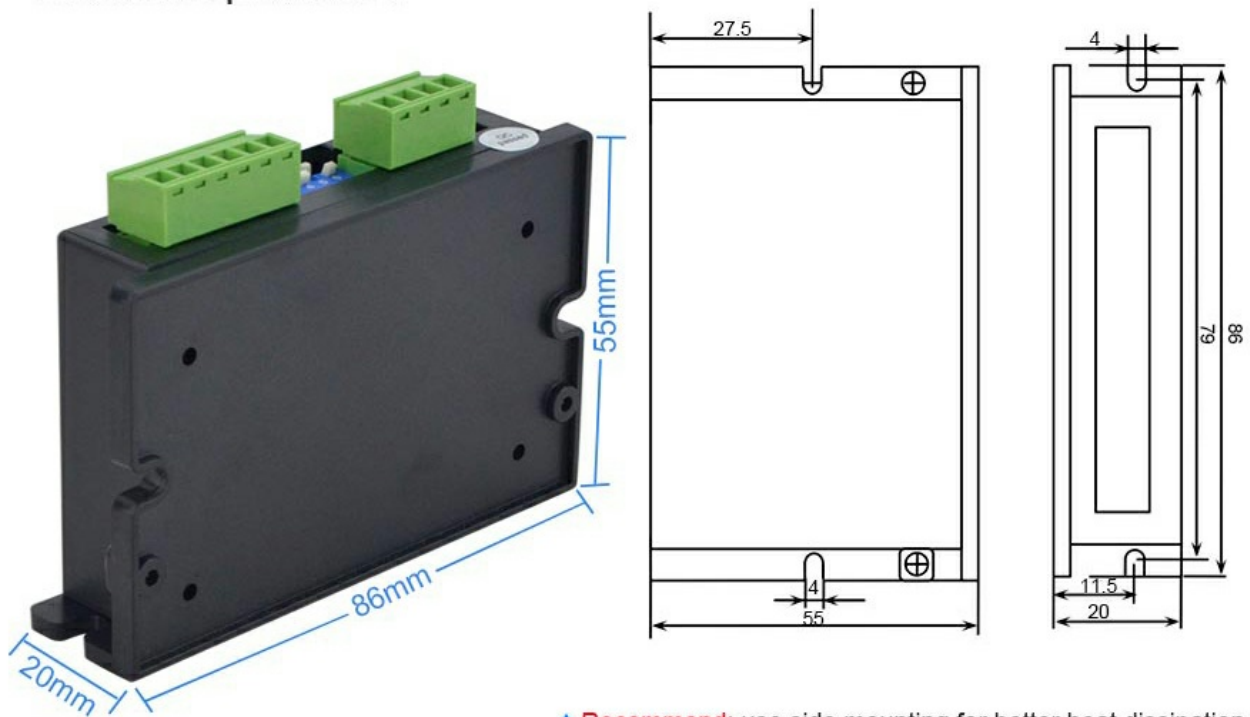
This image details the protection functions of the DM320T driver. The red LED on the driver indicates fault conditions through specific blink patterns:

- **1 Blink:** Over-current protection activated (peak current exceeds limit).
- **2 Blinks:** Over-voltage protection activated (drive working voltage > 34VDC).
- **3 Blinks:** Reserved.

When protection functions are active, the motor shaft will be free, or the red LED will blink. To reset the drive, remove power, address the underlying problem, and then reapply power.

8. WARRANTY AND SUPPORT

STEPPERONLINE products are manufactured to high quality standards. For warranty information and technical support, please refer to the official STEPPERONLINE website or contact their customer service directly. Keep your purchase receipt for warranty claims.
For additional resources and product information, visit theSTEPPERONLINE Store on Amazon.