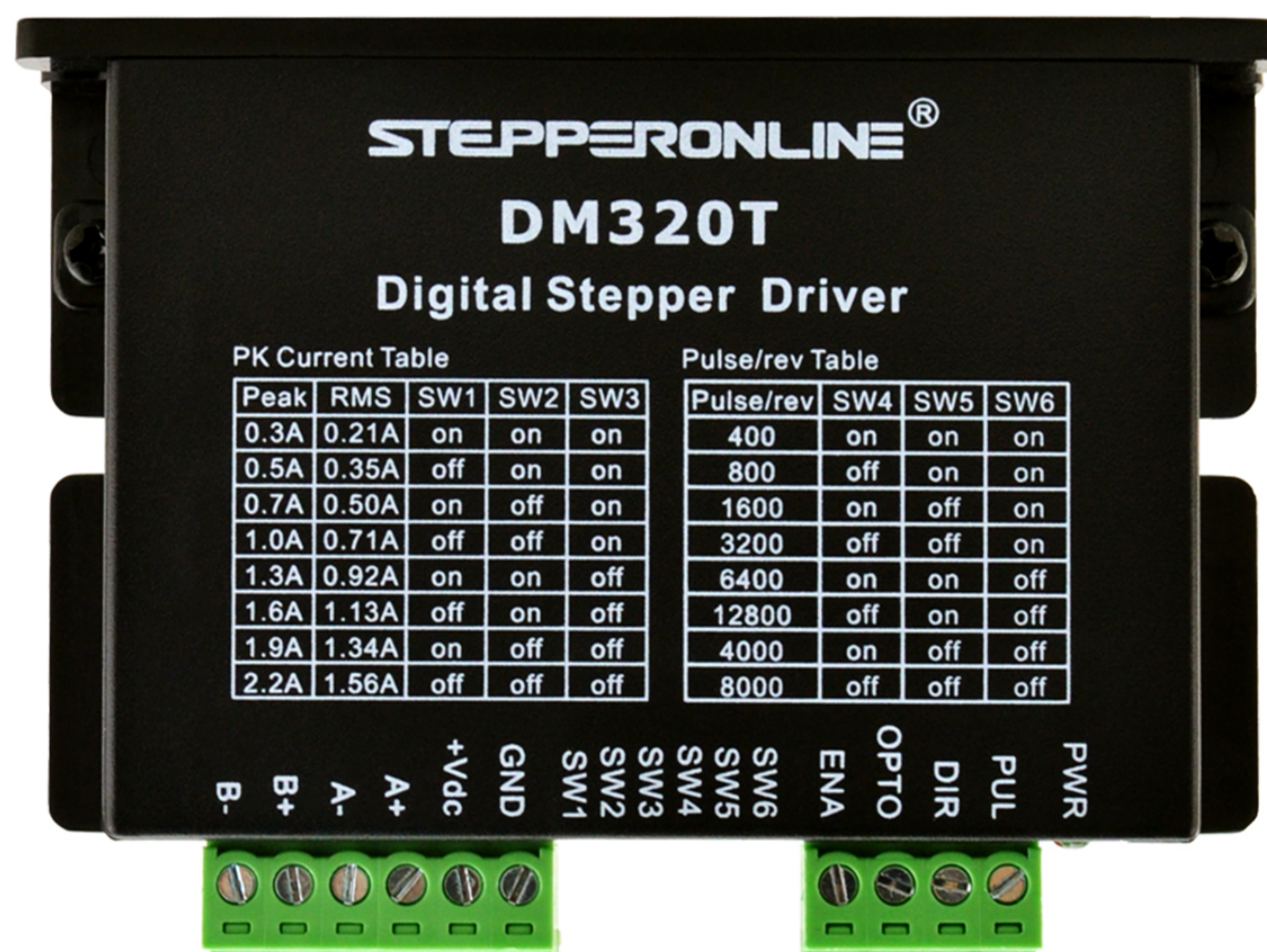


STEPPERONLINE[®]

User Manual

DM320T

2-Phase Digital Stepper Drive



#7 Zhongke Road, Jiangning, Nanjing, China

T: 0086-2587156578

Web site: www.omc-stepperonline.com

E-Mail: sales@stepperonline.com

Table of Contents

1. Introductions	1
1.1 Features.....	1
1.2 Applications.....	1
2. Specifications	1
2.1 Electrical Specifications.....	1
2.2 Environment.....	2
2.3 Mechanical Specifications.....	2
2.4 Elimination of Heat.....	2
3. Connection Pin Assignments and LED Indication	3
3.1 Connector P1 Configurations.....	3
3.2 Connector P2 Configurations.....	3
3.3 LED Light Indication.....	4
4. Control Signal Connector (P1) Interface	4
5. Motor Connection	5
5.1 Connections of 4-lead Motor.....	5
5.2 Connections of 6-lead Motor.....	5
5.2.1 Half Coil Configuration	5
5.2.2 Full Coil Configuration	5
5.3 Connections of 8-lead Motor.....	6
5.3.1 Series Connection	6
5.3.2 Parallel Connection	6
6. Power Supply Selection	6
6.1 Regulated or Unregulated Power Supply.....	7
6.2 Power Supply Sharing.....	7
6.3 Selecting Supply Voltage.....	7
7. DIP Switch Configurations	7
7.1 Microstep Resolution Configurations.....	7
7.2 Current Configurations.....	8
7.2.1 Dynamic Current Configurations	8
7.2.2 Standstill Current Configuration	8
7.3 Automatic Motor Matching & Self Configuration.....	8
8. Wiring Notes	9
9. Typical Connection	9
10. Sequence Chart of Control Signals	9
11. Protection Functions	10
12. Troubleshooting	11

1. Introductions

The DM320T is a digital stepper drive with simple design and easy setup. By implementing advanced stepper control technology, this stepper drive is able to power 2-phase and 4 phase stepper motors smoothly with optimal torque and low motor heating & noise. Its operating voltage is 10-30VDC and it can output up to 2.2A current. All the micro step and output current are done via DIP switches. Therefore, the DM320T are ideal choices for applications requiring simple step & direction control of NEMA11, 14, 16, 17 stepper motors.

1.1 Features

- Anti-Resonance for optimal torque, extra smooth motion, low motor heating and noise
- Motor auto-identification and parameter auto-configuration for optimal torque from wide-range motors
- Step & direction (PUL/DIR) control
- Multi-Stepping for smooth motor movement
- Optically isolated inputs
- Input voltage 10-30VDC
- 8 selectable micro-step resolutions of 400-12800 via DIP switches
- 8 selectable output current settings of 0.3 – 2.2A via DIP switches
- Soft-start with no “jump” when powered on
- Pulse input frequency up to 60 KHz.
- Automatic idle-current reduction
- Protections for over-voltage and over-current

1.2 Applications

The DM320T stepper drive are designed to power 2 phase (1.8°) or 4-phase (0.9°) NEMA11, 14, 16, 17 hybrid stepper motors. It can be easily adopted in many industries (CNC, medical, automation, packaging...), such as X-Y tables, engraving machines, labeling machines, mills, plasma, laser cutters, pick and place devices, and so on. Its excellent performance, simple design, and easy setup make it ideal for many step & direction control type applications.

2. Specifications

2.1 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	-	-	μS
Minimal direction setup	7.5	-	-	μS
Isolation resistance	100			MΩ

2.2 Environment

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)	

2.3 Mechanical Specifications

(unit: mm [1inch=25.4mm])

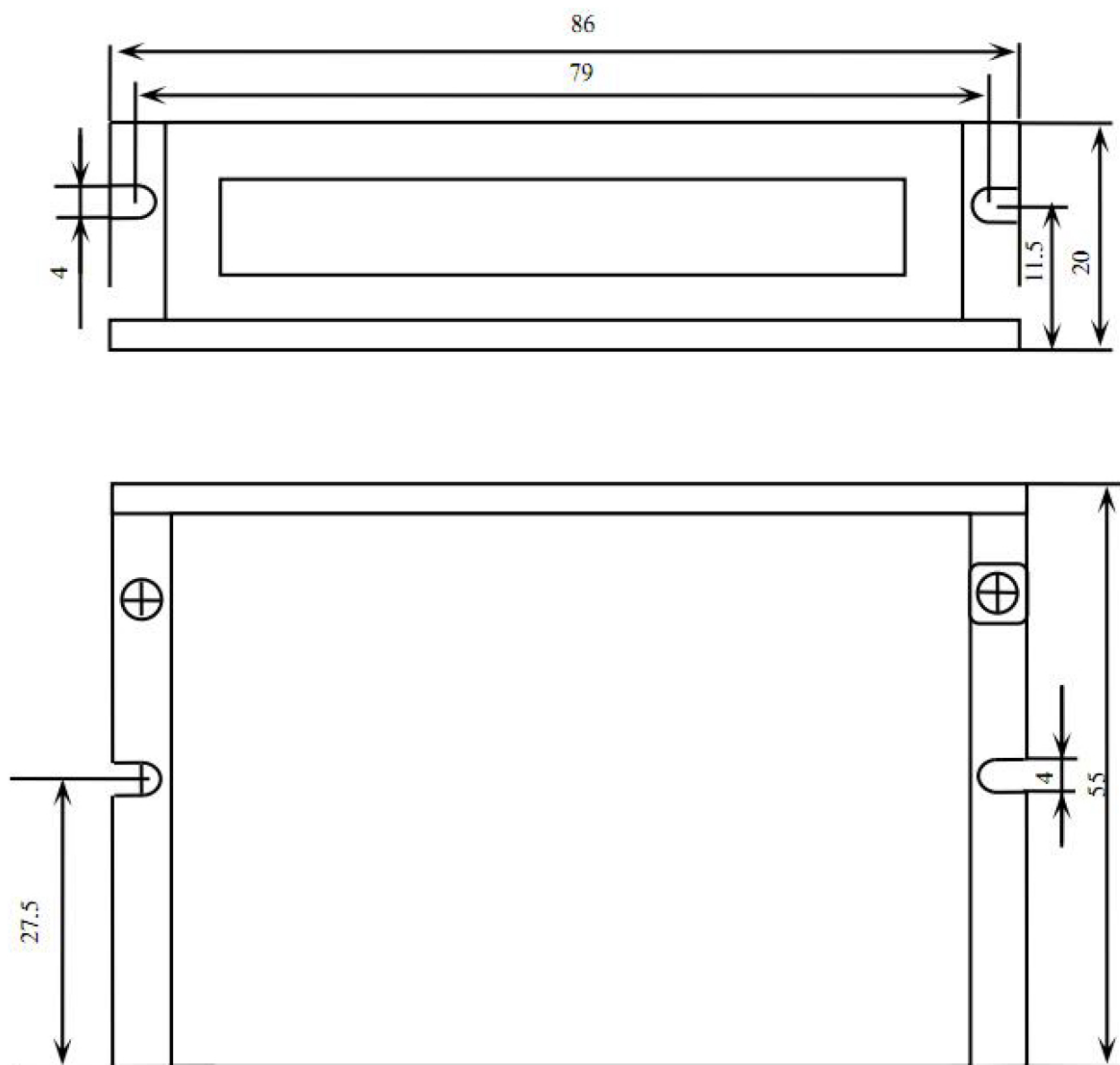


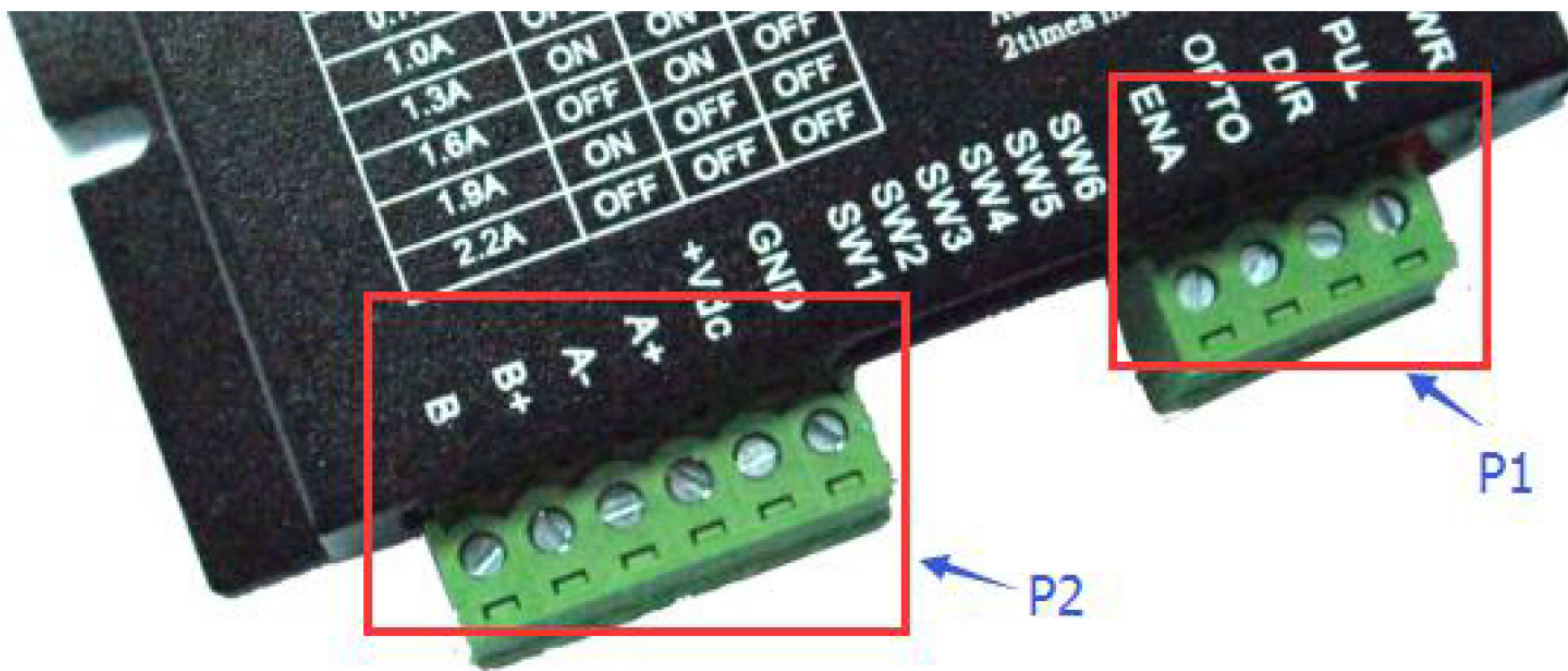
Figure 1: Mechanical specifications

*** Side mounting recommended for better heat dissipation**

2.4 Elimination of Heat

- DM320T reliable working temperature should be < 60°C (140°F)
- It is recommended to mount the drive vertically to maximize heat sink area. Use forced cooling method to cool if necessary.

3. Connection Pin Assignments and LED Indication



The DM320T has two connector blocks P1&P2 (see above picture). P1 is for control signals connections, and P2 is for power and motor connections. The following tables are brief descriptions of the two connectors. More detailed descriptions of the pins and related issues are presented in section 4, 5, 9.

3.1 Connector P1 Configurations

Pin Function	Details
PUL	<u>Pulse signal</u> : Pulse active at rising edge; 4-5V when PUL-HIGH, 0-0.5V when PUL-LOW. Minimal pulse width of 7.5µs. Add a resistor for current-limiting at +12V or +24V input logic voltage (1K for +12V, 2k for +24V). The same as DIR and ENA signals.
DIR	<u>DIR signal</u> : This signal has low/high voltage levels to represent two directions of motor rotation.. Minimal direction setup time of 5µs. Also swapping the connection of two wires of a coil (e.g. A+ and A-) to the drive will reverse motor direction.
OPTO	Opto-coupler power supply, and the typical voltage is +5V. Series connect resistors (at the PUL, DIR, ENA terminals) for current-limiting when +12V or +24V used.
ENA	<u>Enable signal</u> : This signal is used for enabling/disabling the drive. High level +5V (NPN control signal) for enabling the drive and low level for disabling the drive. PNP and Differential control signals are on the contrary, namely Low level for enabling. By default it is left UNCONNECTED (ENABLED) .



Notes: (1) shielding control signal wires is suggested; (2) To avoid interference, don't tie PUL/DIR control signal and motor wires together

3.2 Connector P2 Configurations

Pin Function	Details
GND	Power supply ground connection.
+Vdc	Power supply positive connection. Suggest 24VDC power supply voltage
A+, A-	Motor Phase A connections. Connect motor A+ wire to A+ Pin; motor A- wire to A-
B+, B-	Motor Phase B connections. Connect motor B+ wire to B+ Pin; motor B- wire to B-



Warning: Don't plug or unplug the P1 & P2 terminal block to avoid drive damage or injury when DM320T is powered on.

3.3 LED Light Indication

There are two LED lights for DM320T. The GREEN one is the power indicator which will be always on generally. The RED one is a protection indicator which will flash 1-2 times in a 3-second period, when protection enabled for a DM320T. Different number of flashes indicates different protection type (read section 11 for detail).

4. Control Signal Connector (P1) Interface

The DM320T can accept differential and single-ended inputs (including open-collector and PNP output). The DM320T has 3 optically isolated logic inputs which are located on connector P1 to accept line drive control signals. These inputs are isolated to minimize or eliminate electrical noises coupled with the drive control signals. Recommend using line drive control signals to increase noise immunity for the drive in interference environments. In the following figures, connections to open-collector and PNP signals are illustrated.

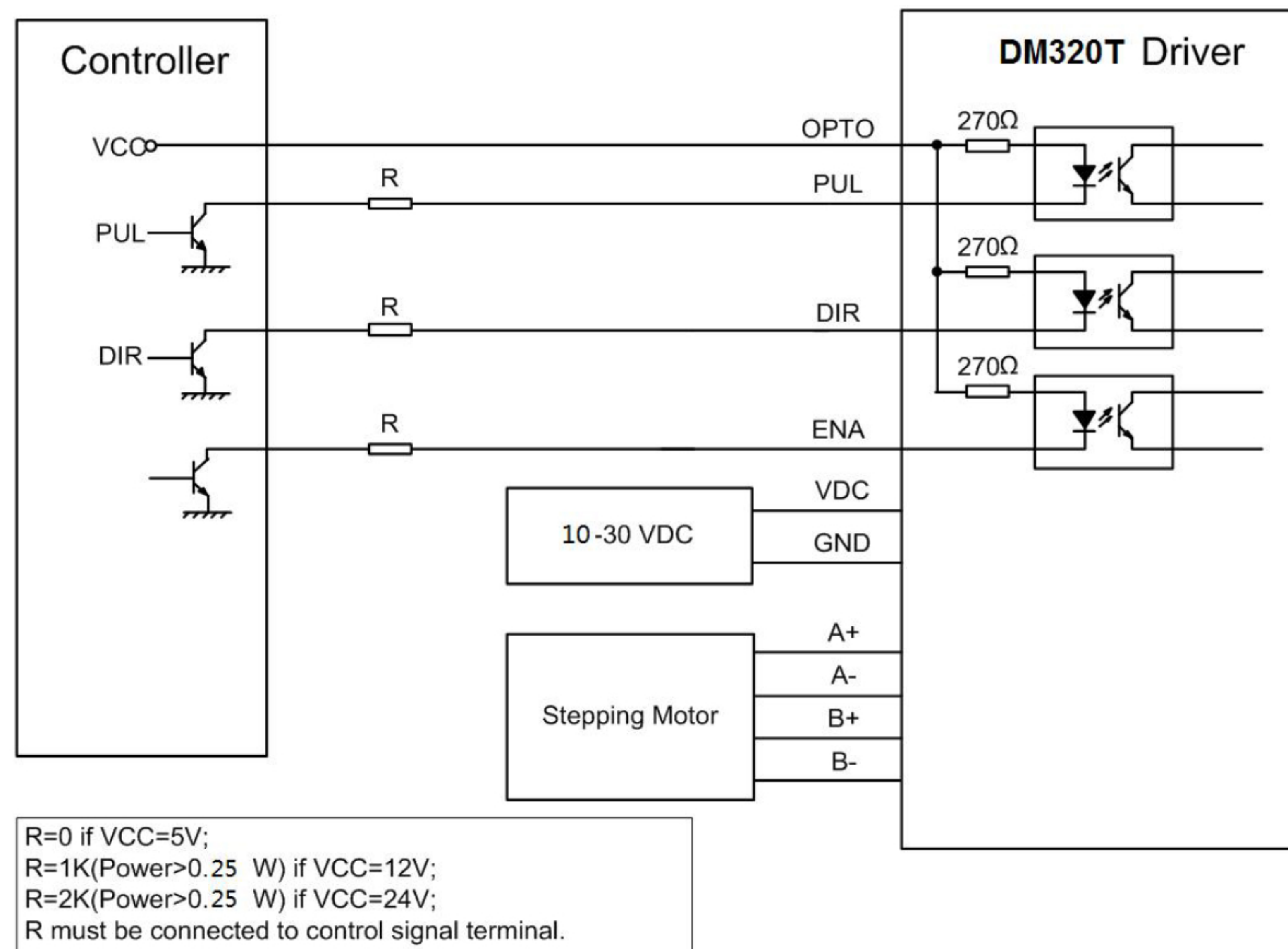


Figure 2: Connections to open-collector signal (common-anode)

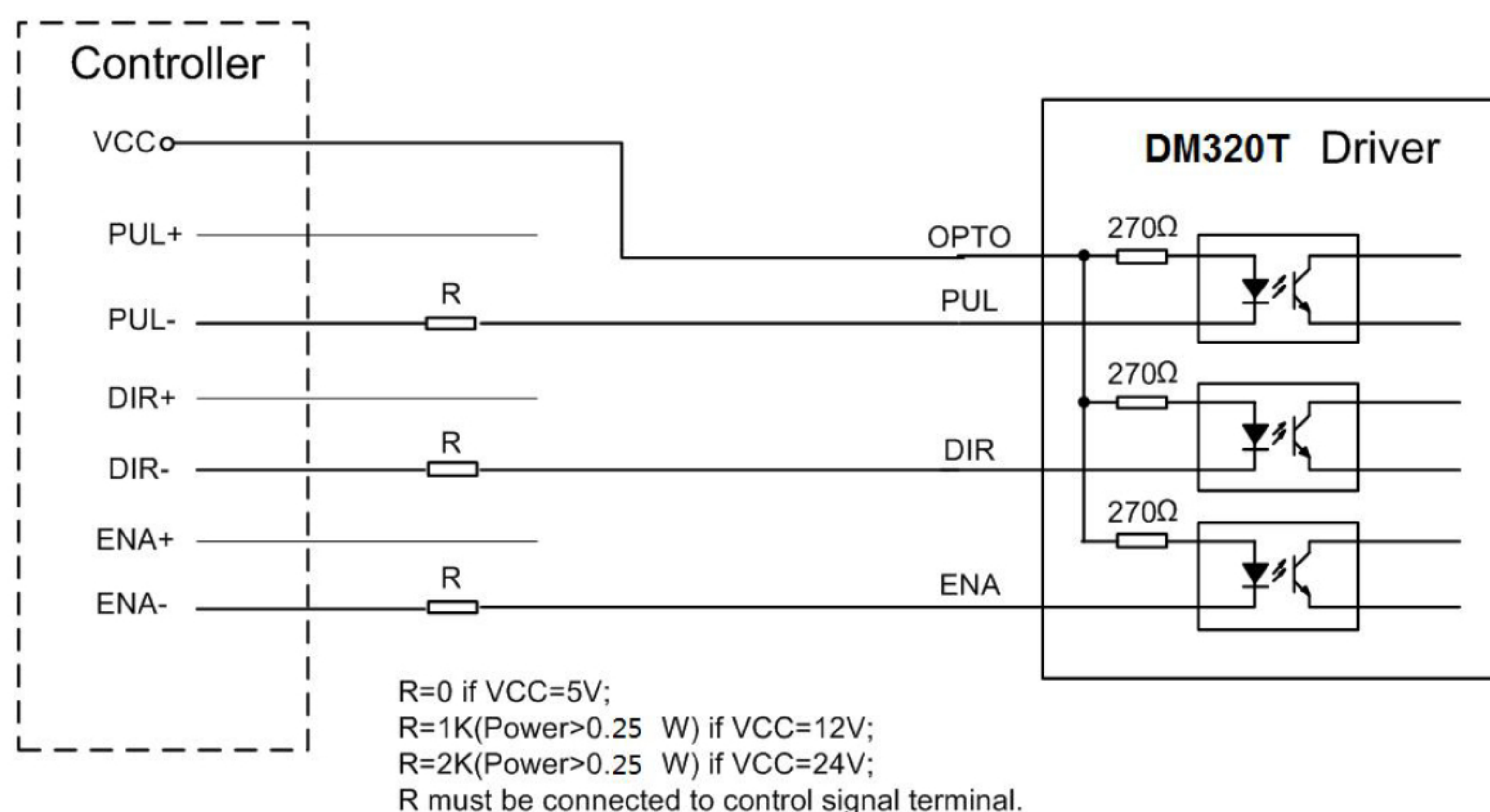


Figure 3: Connections to difference control signal