

Stepper Motor Driver

DM556M



1. Features:

- Supply voltage up to +50 VDC (recommended not above 45 V due to "back EMF")
- Output current selectable in eight steps from 1.8 to 5.6 A (peak) via DIP switch
- Automatic current reduction (in idle mode) to reduce the motor heat
- „Soft-Start“ – no “Jump” when powered on
- Pulse input frequency up to 200 KHz
- Optically isolated inputs
- 16 selectable micro-step resolutions of 200 - 51.200 via DIP switches
- Suitable for 2-phase and 4-phase motors
- Protections for over-voltage and over-current

2. Description:

The DM556M is a digital stepper drive with simple design and easy setup. 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 20 – 50 V DC and it can output up to 5.6 A current. All the micro step and output current are done via DIP switches. Therefore, the DM556M is an ideal choice for Applications requiring simple step & direction control of NEMA 23, 24 and 34 stepper motors.

3. Applications:

Suitable for a wide range of stepper motors of NEMA sizes 23, 24 and 34 (57 x 57 mm to 86 x 86 mm). It can be used in various kinds of machines, such as X-Y tables, engraving machines, labelling machines, laser cutters, pick-place devices, and so on. Particularly well suited for applications where low noise levels, less heat development, high speed and high precision are desired.

4. Electrical Specification:

| Parameters | Min. | Typ. | Max. | Unit |
|-------------------------|------|---------|---------------|------|
| Output current | 1.8 | - | 5.6 (4.0 RMS) | A |
| Supply Voltage | 24 | 36 - 48 | 50 | V DC |
| Logical Signal Current | 7 | 10 | 16 | mA |
| Pulse input frequency | 0 | - | 200 | kHz |
| Minimal pulse width | 2.5 | | | µs |
| Minimal direction setup | 5.0 | | | µs |
| Isolation Resistance | 500 | | | MΩ |

5. Further Specifications:

| Parameters | Min. | Typ. | Max. |
|------------------------------|------------|------|------------|
| Microsteps / 1.8° | 200 | | 51200 |
| Puls / Direction (PUL / DIR) | | X | |
| NEMA Sizes | 23 | | 34 |
| Motor Type Mecheltron | 57BYGH-XXX | | 86BYGH-XXX |

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6. Environment:

| | | |
|-----------------------|---------------------------|--|
| Cooling | Natural or forces cooling | |
| Operating Environment | Environment | Avoid dust, oil, fog and corrosive gases |
| | Ambient Temperature | 0 °C - 40 °C |
| | Humidity | 40 % RH bis 90 % RH |
| | Operating Temperature | max. 90 °C |
| Storage Temperature | -20 °C to 65 °C | |

7. DIP Switch Settings:

| Dynamic Current Configuration | | | | |
|-------------------------------|-------------|------|------|------|
| Peak Current | RMS Current | SW 1 | SW 2 | SW 3 |
| 1,50 A | 1,10 A | Off | Off | Off |
| 2,10 A | 1,50 A | On | Off | Off |
| 2,70 A | 1,90 A | Off | On | Off |
| 3,20 A | 2,30 A | On | On | Off |
| 3,80 A | 2,70 A | Off | Off | On |
| 4,30 A | 3,10 A | On | Off | On |
| 4,90 A | 3,50 A | Off | On | On |
| 5,60 A | 4,00 A | On | On | On |

SW4 is used to set the percentage of the motor idle current. In the OFF position, this means that the stall current is set to 50% of the selected output current. In the ON position, this means that the stall current is set equal to the selected dynamic current. The current is automatically reduced to 50% of the selected dynamic current 0.4 seconds after the last pulse.

| Micro-Step-Resolution Configuration | | | | | |
|-------------------------------------|-------------------|------|------|------|------|
| Micro Steps | Steps/rev. (1,8°) | SW 5 | SW 6 | SW 7 | SW 8 |
| 1 | 200 | On | On | On | On |
| 1/4 | 800 | Off | On | On | On |
| 1/8 | 1600 | On | Off | On | On |
| 1/16 | 3200 | Off | Off | On | On |
| 1/32 | 6400 | On | On | Off | On |
| 1/64 | 12800 | Off | On | Off | On |
| 1/128 | 25600 | On | Off | Off | On |
| 1/256 | 51200 | Off | Off | Off | On |
| 1/5 | 1000 | On | On | On | Off |
| 1/10 | 2000 | Off | On | On | Off |
| 1/20 | 4000 | On | Off | On | Off |
| 1/25 | 5000 | Off | Off | On | Off |
| 1/40 | 8000 | On | On | Off | Off |
| 1/50 | 10000 | Off | On | Off | Off |
| 1/100 | 20000 | On | Off | Off | Off |
| 1/200 | 40000 | Off | Off | Off | Off |

8.Pin Assignment:

| Pin | Details |
|----------|---|
| PUL + | PUL signal: Pulse active on rising edge; 4-5V for PUL-HIGH, 0-0.5V for PUL-LOW. Minimum pulse width of 2.5µs. Add resistor to limit current at +12V or +24V input logic Voltage (1KΩ for +12V, 2kΩ for +24V). Same for DIR and ENA signals. |
| PUL - | |
| DIR + | DIR signal: This signal has low/high voltage levels representing two directions of motor rotation. Minimum direction setting time of 5µs. |
| DIR - | |
| ENA + | ENA signal: This signal is used to enable/disable the inverter. High level +5V (NPN control signal) to enable the inverter and low level to disable the inverter. By default it is Unconnected (ENABLED). |
| ENA - | |
| GND | Ground connection of the power supply. |
| +V | Positive connection of the power supply. Recommended supply voltage 24-48VDC |
| A +; A - | Connections of Motor Phase A. |
| B +; B - | Connections of Motor Phase B. |

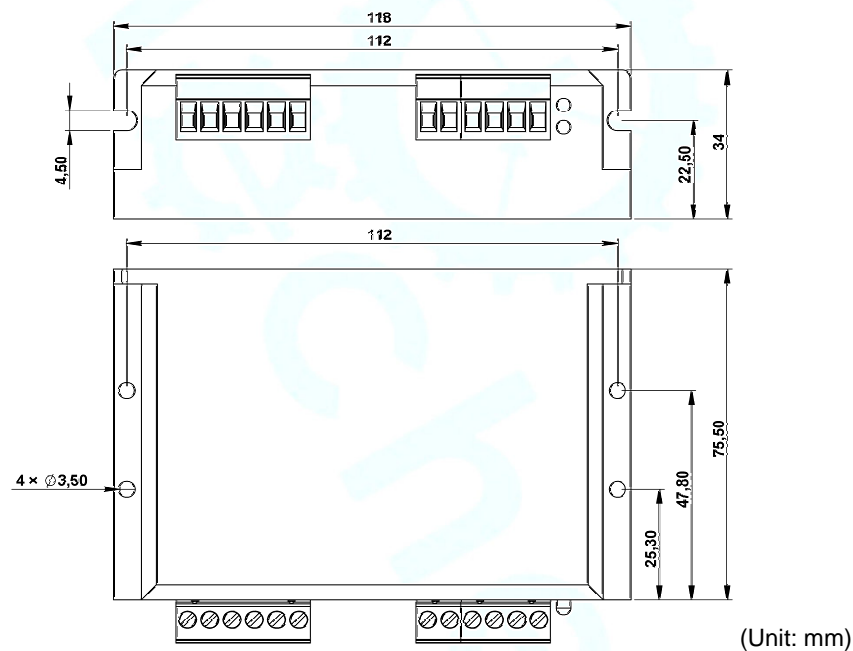
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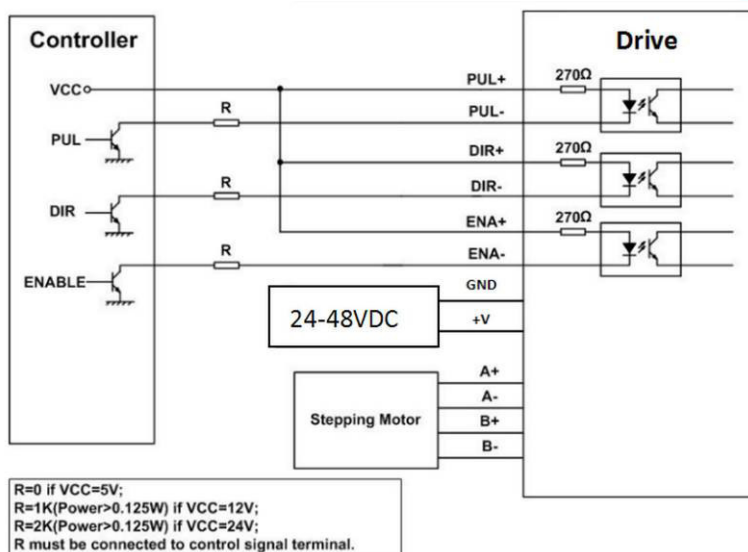
9. Protection Indication:

| Incident | Possible cause | Possible solution |
|-------------------|------------------------------|---|
| Red LED lights up | Short circuit of motor wires | Inspect or replace motor cables |
| | Voltage supplied too high | Reduce voltage supplied to $\leq 50V$ DC. |

10. Mechanical Data:



11. Wiring:



A complete system consists of stepper motor, stepper motor driver, power supply and controller (pulse generator). A typical connection diagram is shown in the left figure.