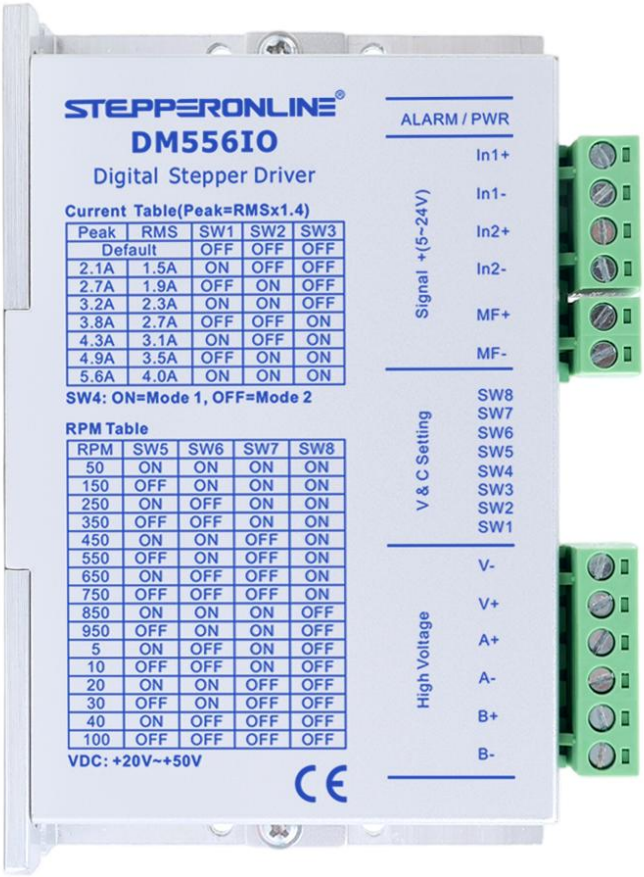
User Manual

# DM556IO

IO type open loop stepper driver instruction manual

Version：V1.0



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# Catalogue

# Revision history

| Version | Description | Date | Remark |
|---|---|---|---|
| V1.0 | First edition release | 2025.04.18 | |
| | | | |
| | | | |
| | | | |
| | | | |

# Introduction

Thank you for using this stepper drive.

Before using this product, be sure to read this manual carefully to understand the necessary safety information, precautions, and operation methods.

The wrong operation can lead to extremely serious consequences.

# Statement

The design and manufacture of this product does not have the ability to protect personal safety from the threat of mechanical systems. Users are requested to consider safety protection measures during the design and manufacture of mechanical systems to prevent accidents caused by improper operation or abnormal products.

Due to product improvements, the contents of the manual are subject to change without notice.

Our company will not be responsible for any modification of the product by the user.

When reading, please note the following marks in the manual:

Remind you to pay attention to the main points in the text.

Indicates that improper operations may result in personal injury or equipment damage.

# Chapter 1 Overview

## 1.1 Product introduction

DM556IO is a high-performance stepper driver based on a new generation of digital control technology. The control mode of the driver is spontaneous pulse speed control, 16 segments of speed can be selected by 4 dialing codes, and any speed can be set within the speed range by the host computer. Three-channel photoelectric isolation digital input, the driver supports motor parameter identification adaptive and phase memory function; In the internal use of similar servo control principle, unique circuit design, superior software algorithm processing can make the motor running smoothly at low speed, precise current control technology greatly reduces the motor heat, in the user expects low heat, low noise, high stability, high precision equipment application effect is particularly good.

## 1.2 Peculiarity

- New generation of 32-bit DSP control technology, high cost performance
- Three optical coupling isolated digital signal input, compatible with 5V/24V signal, support common negative and common positive connection mode
- With the latest resonance suppression algorithm, it has excellent stationarity at low and medium speed.
- Current control smooth, accurate, motor heating is small
- With 8 levels of current, 16 levels of speed optional
- Operating current, speed, acceleration and deceleration can be set in the PC debugging software
- Start-stop control supports two modes
- Adaptive identification of motor parameters
- Phase memory function
- The lock current can be set by the host computer, the default is to set the current 50%
- With over voltage, under voltage, over current, error equal protection function

## 1.3 Application field

Typical applications: mainly used for speed control, board machine, board machine, docking station, logistics transmission, moving load equipment, electronic equipment, lithium equipment, etc .

# Chapter 2 Performance Indicators

## 2.1 Electrical characteristic

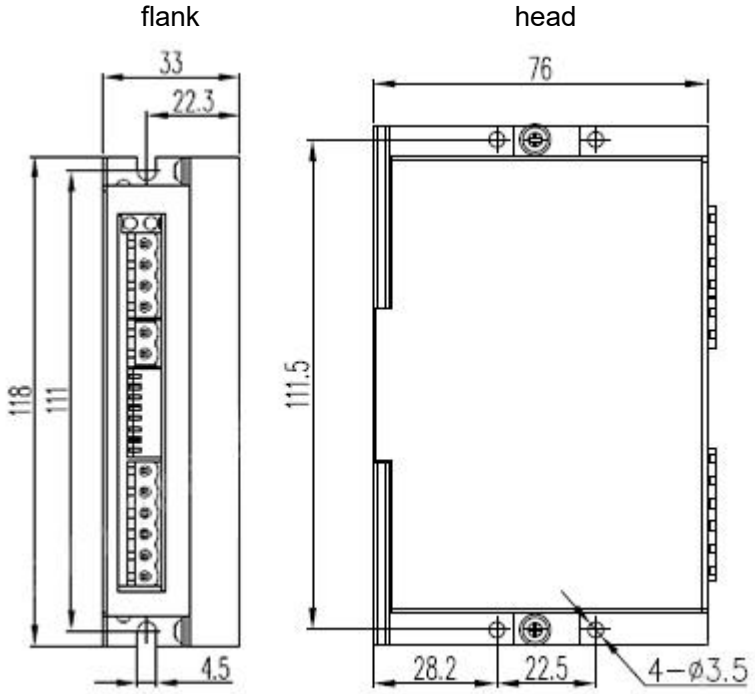
| Argument | DM556IO | | | |
|---|---|---|---|---|
| | Minimum value | Typical value | Maximum value | Unit |
| Continuous output current | 0 | - | 4.0 | A |
| Input supply voltage | 24 | 24 | 50 | Vdc |
| Logic input current | 7 | 10 | 20 | mA |
| Insulation resistance | 50 | - | - | MΩ |

## 2.2 Using environment

| Cooling mode | Natural cooling | |
|---|---|---|
| Use environment | Use occasion | Try to stay away from other heating equipment, avoid dust, oil mist, corrosive gas, strong vibration places, flammable gas and conductive dust are prohibited |
| | Temperature | 0℃~50℃ |
| | Humidity | 40-90%RH（non-condensation） |
| | Vibration | 10~55Hz/0.15mm |
| Storage temperature | -20℃~+70℃ | |

# Chapter 3 Installation

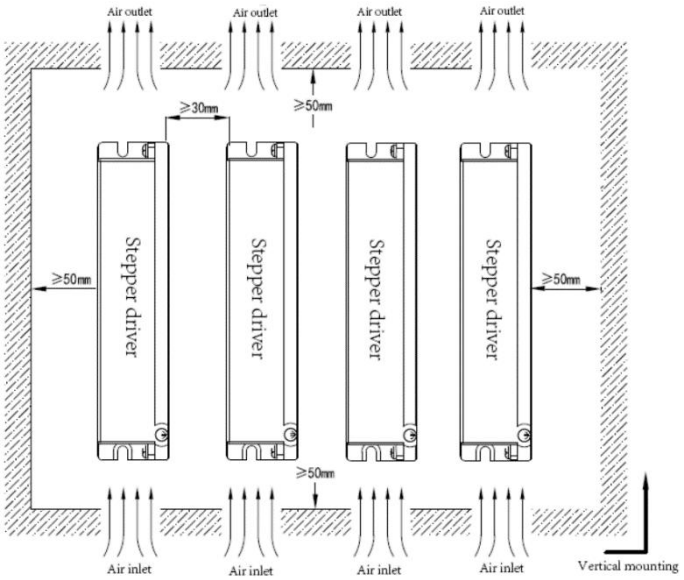
## 3.1 Mounting dimension




**Mounting dimension drawing (unit: mm)**

## 3.2 Installation Methods

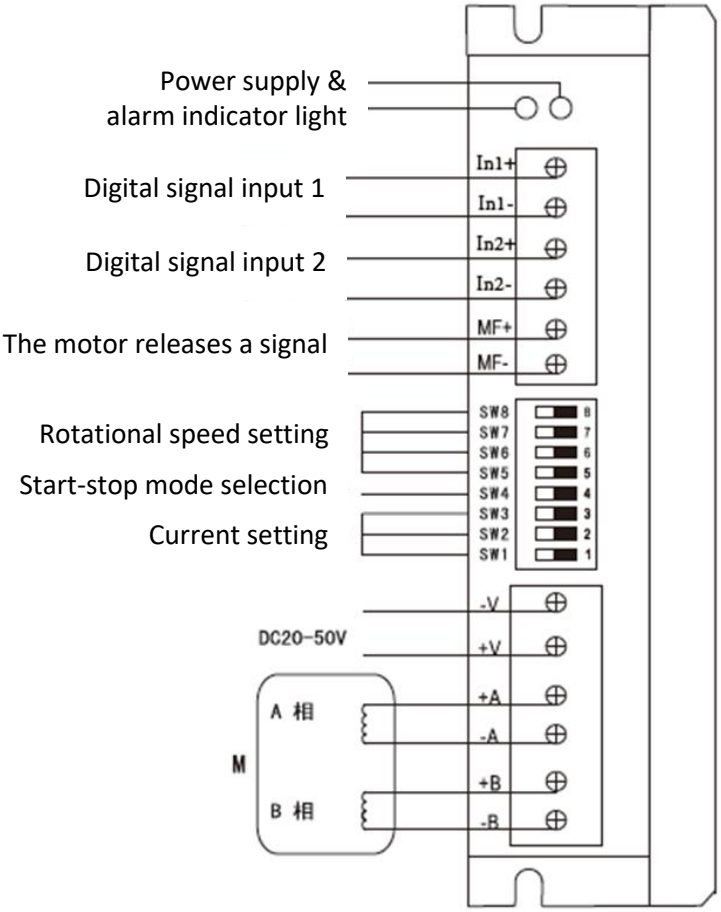
When installing the driver, please use the upright side installation to form strong air convection on the driver surface; If necessary, install a fan close to the driver to force the heat to dissipate to ensure that the driver works within the reliable operating temperature range (the reliable operating temperature of the driver is usually within 50°C, and the operating temperature of the motor is within 80°C).



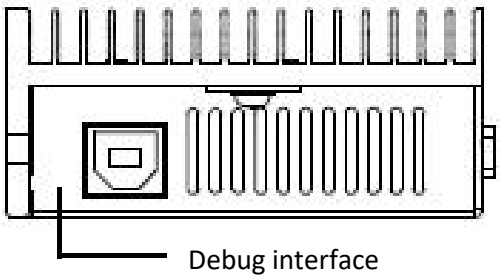
# Chapter 4 Driver Ports and Wiring

## 4.1 Wiring diagram

Use the DM556IO drive according to the interface diagram:




**Drive front wiring diagram**




**Schematic of the top of the drive**

**Attention!**

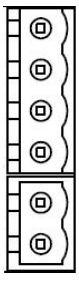
- The personnel involved in wiring must have professional ability.
- No live wiring.
- The wiring can only be carried out after the installation is firm.
- Do not connect the power supply wrong, the input voltage should not exceed 50VDC.

## 4.2 Port Definition

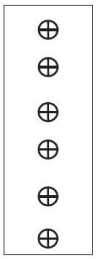
### 4.2.1 Status indicator light

| Color | Name | Features |
|---|---|---|
| Green | Power indicator light | When the power is on, the green indicator lights up. |
| Red | Fault indicator light | Drive overcurrent: Flicker once;<br>Drive overvoltage: Flicker twice;<br>Drive undervoltage: Flicker three times;<br>Motor out of phase: Flicker four times; |

### 4.2.2 Control signal input port

| Port | Lean | Symbol | Function | Comments |
|---|---|---|---|---|
|  | 1 | In1+ | Step control signal photoelectric isolation positive and negative end | Connect the signal power supply, +5~24V input, higher than 24V need to connect the current limiting resistor |
| | 2 | In1- | | The motor starts to run when the level changes from high to low |
| | 3 | In2+ | Direction control signal photoelectric isolation positive and negative end | Direction signal input positive end, +5~24V input, higher than 24V need to connect the current limiting resistor |
| | 4 | In2- | | Used to change the motor commutation |
| | 5 | MF+ | Motor release signal photoelectric isolation positive and negative end | Connect the signal power supply, +5~24V input, higher than 24V need to connect the current limiting resistor |
| | 6 | MF- | | When effective, turn off the coil current of the motor and the motor is in free state. |

### 4.2.3 Power input and motor port

| Port | Lead | Symbol | Name | Function |
|---|---|---|---|---|
|  | 1 | V- | Power interface | DC20-50V |
| | 2 | V+ | | |
| | 3 | A+ | Motor interface | Two phase stepper motor connector |
| | 4 | A- | | |
| | 5 | B+ | | |
| | 6 | B- | | |

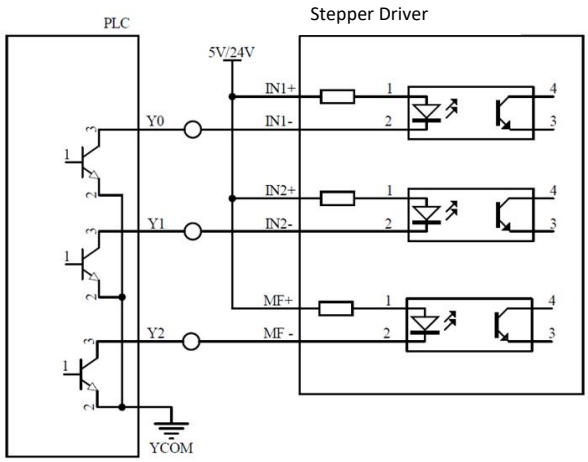
### 4.2.4 Dip switch

| Port | Lean | Symbol | Function |
|---|---|---|---|
|  | 1 | SW1 | Current value setting |
| | 2 | SW2 | |
| | 3 | SW3 | |
| | 4 | SW4 | Control mode setting |
| | 5 | SW5 | Motor speed setting |
| | 6 | SW6 | |
| | 7 | SW7 | |
| | 8 | SW8 | |

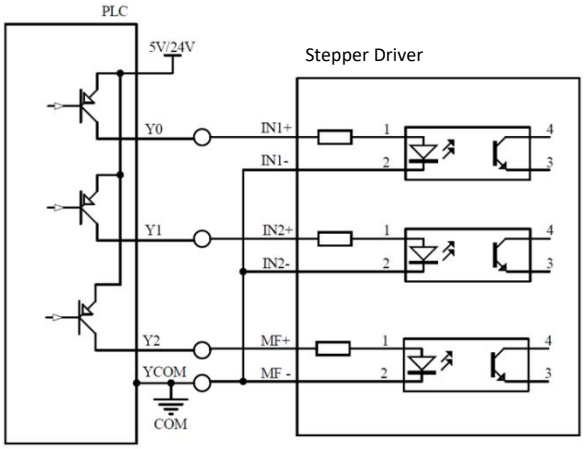
## 4.3 Input/output port operation

The DM556IO driver has three digital inputs, photoelectric isolation, and the signal supports 5V-24V input. When the input signal is higher than 24V, the series current limiting resistance is required at the signal input end. The specific wiring diagram is as follows:

### 4.3.1 Input



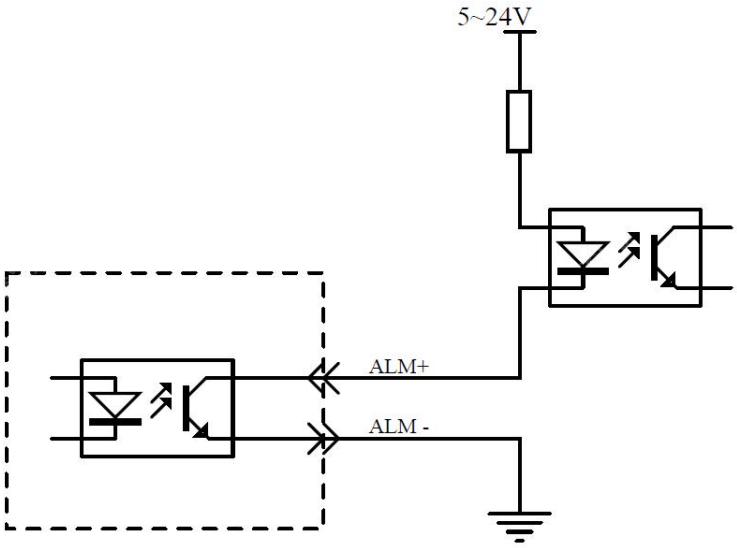

Common positive connection




Common negative connection

## 4.3.2 Output

The DM556IO contains a photoelectric isolated output port that defaults to an alarm signal and outputs an alarm signal when the driver is in an error state.




Note: The access voltage of the alarm output circuit does not exceed 30V, and the current does not exceed 50mA.

# Chapter 5 Drive operation parameter Settings

The DM556IO stepper motor driver uses a 6-bit dip switch to set the driver current and subdivision. The specific Settings are as follows:

## 5.1 Driver current setting

The DM556IO driver sets the peak output current or RMS value through SW1, SW2, SW3 dip switches.

Normally, the current is set to the rated current of the motor. If your system has high heating requirements, you can appropriately reduce the current to reduce the heat of the motor, but the output torque of the motor will be reduced at the same time. If you do not require continuous operation of the motor, you can appropriately increase the running current to obtain greater torque.

DM556IOAmmeter of current: (unit: A)

| Current RMS | Current PEAK | SW1 | SW2 | SW3 |
|---|---|---|---|---|
| Default | Default | OFF | OFF | OFF |
| 1.5 | 2.1 | ON | OFF | OFF |
| 1.9 | 2.7 | OFF | ON | OFF |
| 2.3 | 3.2 | ON | ON | OFF |
| 2.7 | 3.8 | OFF | OFF | ON |
| 3.1 | 4.3 | ON | OFF | ON |
| 3.5 | 4.9 | OFF | ON | ON |
| 4.0 | 5.6 | ON | ON | ON |

Remark: Current RMS is the effective value, current Peak is the peak value of current

## 5.2 Drive subdivision Settings

The corresponding speed of the driver is set by SW5, SW6, SW7, and SW8 dial switches, as shown in the following table:

| Serial | SW5 | SW6 | SW7 | SW8 | Speed |
|---|---|---|---|---|---|
| 0 | ON | ON | ON | ON | 50 |
| 1 | OFF | ON | ON | ON | 150 |
| 2 | ON | OFF | ON | ON | 250 |
| 3 | OFF | OFF | ON | ON | 350 |
| 4 | ON | ON | OFF | ON | 450 |
| 5 | OFF | ON | OFF | ON | 550 |
| 6 | ON | OFF | OFF | ON | 650 |
| 7 | OFF | OFF | OFF | ON | 750 |
| 8 | ON | ON | ON | OFF | 850 |
| 9 | OFF | ON | ON | OFF | 950 |
| 10 | ON | OFF | ON | OFF | 5 |
| 11 | OFF | OFF | ON | OFF | 10 |
| 12 | ON | ON | OFF | OFF | 20 |
| 13 | OFF | ON | OFF | OFF | 30 |
| 14 | ON | OFF | OFF | OFF | 40 |
| 15 | OFF | OFF | OFF | OFF | 100 |

## 5.3 Control mode setting

SW4=OFF Control Mode 2

| In1 | In2 | Running state |
|---|---|---|
| Invalid | Invalid | Lock machine |
| Valid | Invalid | Vorword |
| Invalid | Valid | Lock machine |
| Valid | Valid | Reversal |

SW4=ON Control Mode 1

| In1 | In2 | Running state |
|---|---|---|
| Invalid | Invalid | Lock machine |
| Valid | Invalid | Forword |
| Invalid | Valid | Reversal |
| Valid | Valid | Lock machine |

## 5.4 MF The motor releases a signal

The motor operating states corresponding to the MF signal when it is valid and invalid are as follows:

| MF signal | Running state |
|---|---|
| Valid | Unlocked machine |
| Invalid | Locked machine |

# Chapter 6 Driver Status Indicators

The DM556IO driver has an alarm prompt. After the driver alarms, the alarm indicator state indicates the alarm information of the driver. The specific alarm information is shown in the following table.

| Fault information | ALM Pilot lamp | Resetting |
|---|---|---|
| Overcurrent or interphase short circuit | Flicker once | Power-off reset |
| Overvoltage of supply | Flicker twice | Automatic restoration of standard voltage |
| Undervoltage of supply | Flicker three times | Automatic restoration of standard voltage |
| Motor out of phase | Flicker four times | Recover after the phase sequence returns to normal |

# Chapter 7 General Troubleshooting methods

| phenomenon | Possible situation | Solution measure |
|---|---|---|
| Motor failure | The power light is off | Check the power supply circuit. The power supply is normal |
| | The motor locks the shaft but does not turn | The IO signal is weak and the signal current is increased |
| | Too little speed | Selection speed |
| | Whether the release signal MF is connected | Will release the signal MF does not connect |
| | Instruction input error | Check whether the upper computer has a switch output |
| Motor steering error | Motor reversal | Replace motor wiring sequence or adjust instruction direction |
| | The motor line has a break | Check whether the cable is in poor contact |
| | The motor has only one direction | Input port damage |
| Alarm indicator light | The motor wire is connected incorrectly | Check the wiring |
| | The voltage is too high or low | Check power supply |
| | The motor or drive is damaged | Replace the motor or drive |
| Wrong position or speed | Signal interference | Eliminate interference, reliable grounding |
| | Instruction input error | Check the upper computer instructions to ensure correct output |
| | Speed setting error | Check the DIP switch status and connect it correctly |
| | Motor tripping | Check whether the command speed is too large and the motor selection is small |
| The driver terminal is burned out | Short-circuit between terminals | Check the power polarity or external short circuit |
| | The internal resistance between terminals is too large | Check whether excess solder is added to the wire and wire connection to form tin pellets |
| Motor stalling | The acceleration and deceleration time is too short | Reduce the command acceleration or increase the driver filter parameter |
| | Motor torque too small | Select high torque motor |
| | Heavy load | Check the load weight and quality, adjust the mechanical structure |
| | Too little current | Check dip switches to increase the output current of the driver |