

# 2DM860

## Digital Stepper Drive

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# Operation Manual



## 1. Overview

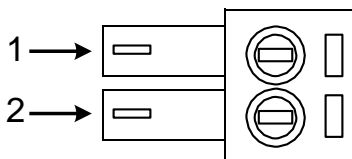
The 2DM860 is a two phase digital stepper driver based on DSP. Its Micro step resolutions and output current are programmable. And it has advanced control algorithm, which can brings a unique level of system smoothness, provides optimum torque and mid-range instability. The control algorithm of Multi-Stepping can make stepper motor has smooth system performance. The control algorithm of torque compensation can improve the torque of motor in the high speed. The control algorithm of motor self-test and parameter auto-setup technology offers optimum responses with different motors and easy-to-use. The control algorithm of smoothness can enhance the acceleration and deceleration of motor. Its unique features make the 2DM860 to be an ideal solution for applications.

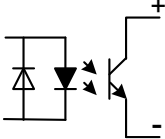
## 2. Features

- ◆ Parameter auto-setup and motor self-test
- ◆ Multi-Stepping inside
- ◆ Small noise, low heating, smooth movement
- ◆ Torque compensation in high speed
- ◆ Variable current control technology, High current efficiency
- ◆ Accelerate and decelerate control inside, Great improvement in smoothness of starting or stopping the motor.
  
- ◆ Support PUL/DIR and CW/CCW modes
- ◆ Storage the position of motor
- ◆ Optically isolated input and compatible with 5V or 24V
- ◆ User-defined micro steps
- ◆ Micro-step resolutions and Output current programmable
- ◆ Over current, over voltage and low voltage protection
- ◆ Green light means running while red light means protection or off line

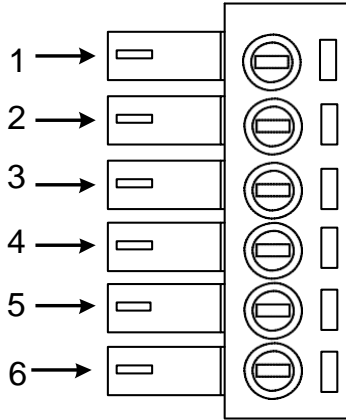
### 3. Ports Introduction

#### 3.1 ALM signal output ports



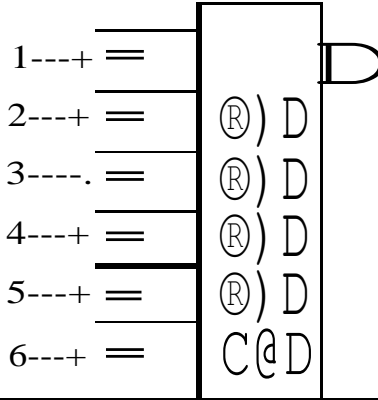
Port	Symbol	Name	Remark
1	ALM+	Alarm output +	
2	ALM-	Alarm output -	

### 3.2 Control Signal Input Ports



Port	Symbol	Name	Remark
1	PLS+	Pulse signal +	Compatible with 5V or 24V
2	PLS-	Pulse signal -	
3	DIR+	Direction signal+	Compatible with 5V or 24V
4	DIR-	Direction signal-	
5	ENA+	Enable signal +	Compatible with 5V or 24V
6	ENA-	Enable signal-	

### 3.3 Power Interface Ports



Pin	Power Input Ports	GND	Input Power-	De24V-60V
		vee	Input Power +	
3	Motor Phase Wire Input Ports	A+	Phase A+	Motor Phase A
4		A-	Phase A-	
5		B+	Phase B+	Motor Phase B
6		B-	Phase B-	

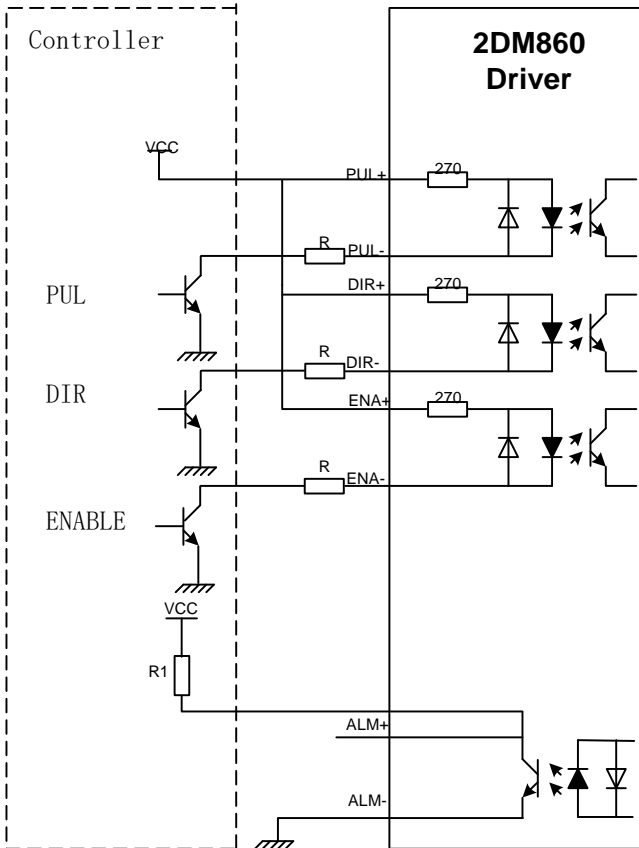
## 4. Technological Index

### Specifications

Parameters	Min	Typical	Max	Unit
<b>Output Current (Peak)</b>	2.1	-	8.4	Amps
<b>Supply voltage</b>	30VAC (D C40V)	60VAC (DC80V)	80VAC(D C110V)	VAC
<b>Logic Input Current</b>	-	10	-	mA
<b>Pulse input frequency</b>	-	-	250	KHz
<b>Low Level Time</b>	2.5	-	-	μsec
<b>Cooling</b>	Natural Cooling or Forced Convection			
<b>Environment</b>	Space	Avoid dust, oil frost and corrosive gases		
	Ambient Temperature	0°C – 65°C		
	Humidity	<80%RH		
	Vibration	5.9m/s <sup>2</sup> Max		
<b>Storage Temp.</b>	-10°C – 80°C			
<b>Weight</b>	Approx. 0.58Kg			

## 5. Connections to Control Signal

### 5.1 Connections to Common Anode

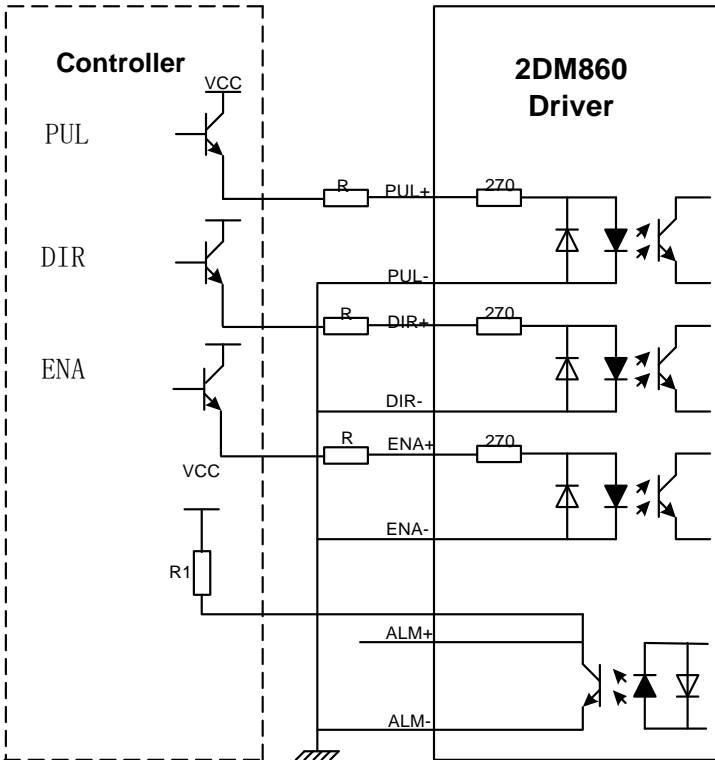


#### Remark:

VCC is compatible with 5V or 24V;

R(3~5K) must be connected to control signal terminal.

## 5.2 Connections to Common Cathode



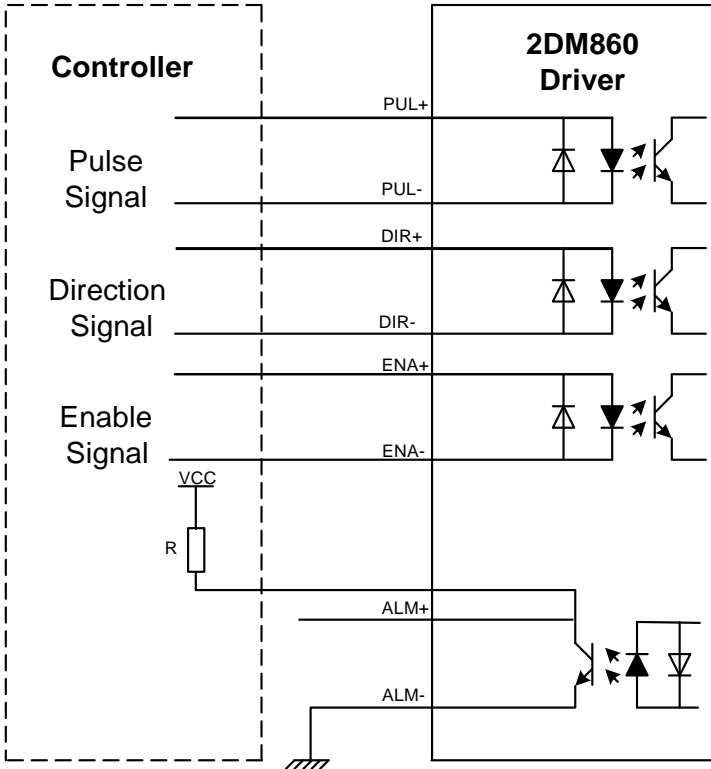
### Remark:

VCC is compatible with 5V or 24V;

R(3~5K) must be connected to control signal terminal.



### 5.3 Connections to Differential Signal

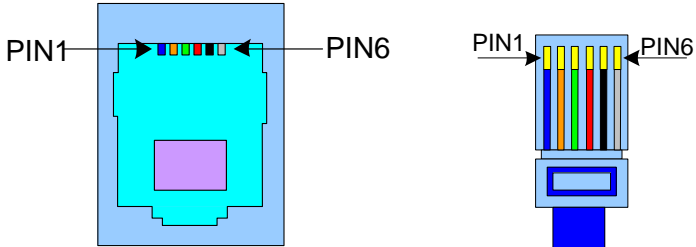


**Remark:**

VCC is compatible with 5V or 24V;

R(3~5K) must be connected to control signal terminal.

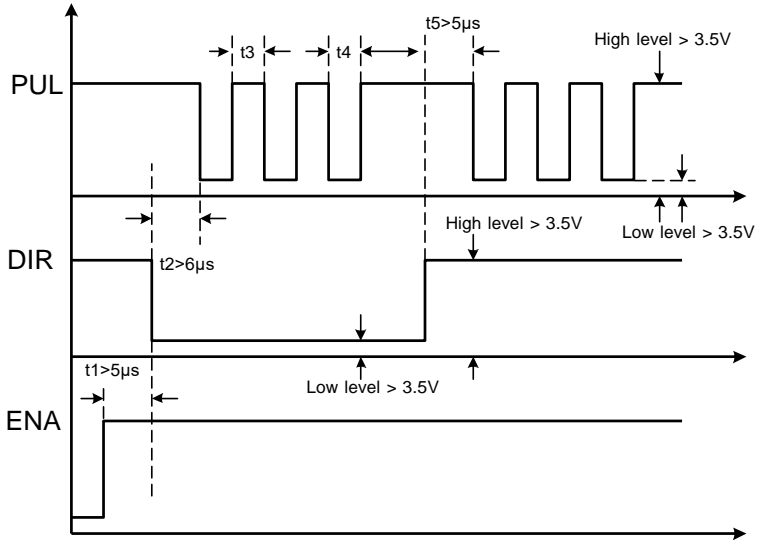
## 5.4 Connections to 232 Serial Communication Interface



Crystal Head foot	Definition	Remark
1	TXD	Transmit Data
2	RXD	Receive Data
4	+5V	Power Supply to HISU
6	GND	Power Ground

## 5.5 Sequence Chart of Control Signals

In order to avoid some fault operations and deviations, PUL, DIR and ENA should abide by some rules, shown as following diagram:



**Remark:**a.  $t_1$ : ENA must be ahead of DIR by at least  $5\mu\text{s}$ .

Usually, ENA+ and

ENA- are NC (not connected).

b.  $t_2$ : DIR must be ahead of PUL active edge by  $6\mu\text{s}$  to ensure correct direction;

c.  $t_3$ : Pulse width not less than  $2.5\mu\text{s}$ ;

d.  $t_4$ : Low level width not less than  $2.5\mu\text{s}$ .

## 6. DIP Switch Setting

### 6.1 Current Setting

The current setting is in the following table.

#### Current Setting:

Current Setting AVG (A)	Peak Value(A)	SW1	SW2	SW3
1.5	2.1	OFF	OFF	OFF
2.25	3.15	ON	OFF	OFF
2.88	4.03	OFF	ON	OFF
3.42	4.78	ON	OFF	ON
4.06	5.69	OFF	OFF	ON
4.60	6.44	ON	OFF	ON
5.25	7.35	OFF	ON	ON
6.0	8.4	ON	ON	ON

### 6.2 Standstill current Setting

SW4 is used for setting the standstill current , “off” means the standstill current is set to be half of the selected dynamic current or other current, which can be set by the HISU, the details can be seen in the tenth sections. While “on” means the standstill current is set to be the same as the selected dynamic current.

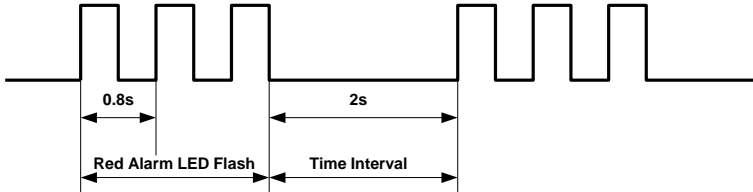
### 6.3 Micro steps Setting

The micro steps setting is in the following table. And the micro steps can be also setting through the HISU. The details can be seen in the tenth sections.

#### Microstep Setting:

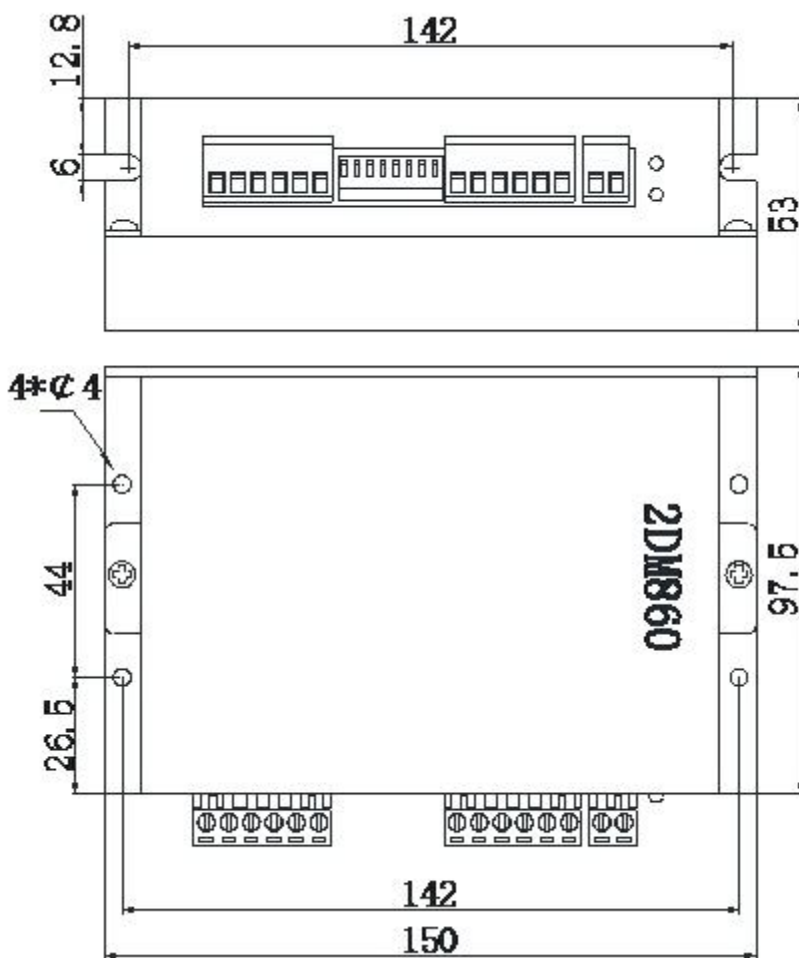
Step/Rev	SW5	SW6	SW7	SW8
400	ON	ON	ON	ON
800	OFF	ON	ON	ON
1600	ON	OFF	ON	ON
3200	OFF	OFF	ON	ON
6400	ON	ON	OFF	ON
12800	OFF	ON	OFF	ON
25600	ON	ON	ON	OFF
51200	OFF	OFF	OFF	ON
1000	ON	ON	ON	OFF
2000	OFF	ON	ON	OFF
4000	ON	OFF	ON	OFF
5000	OFF	OFF	ON	OFF
8000	ON	ON	OFF	OFF
10000	OFF	ON	OFF	OFF
20000	ON	OFF	OFF	OFF
40000	OFF	OFF	OFF	OFF

## 7. Faults alarm and LED flicker frequency



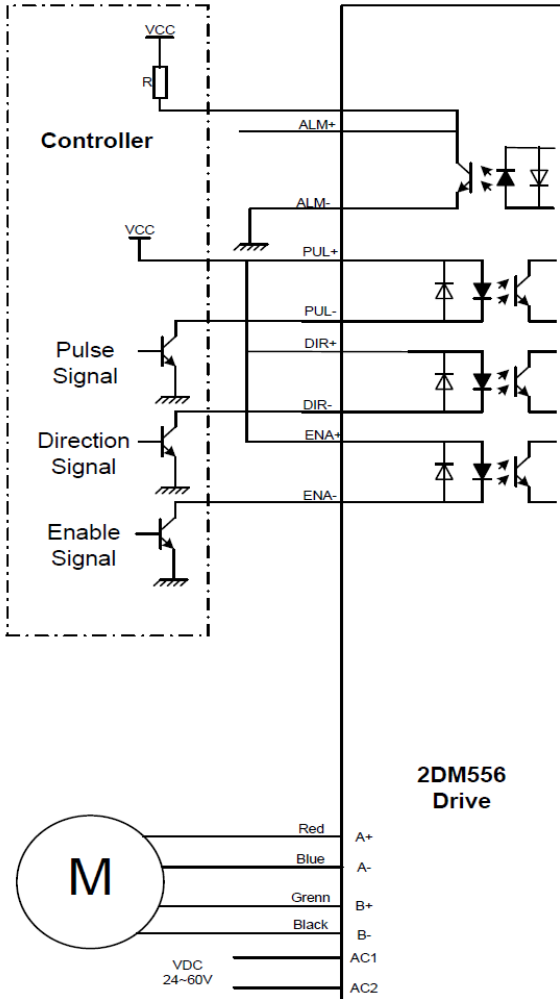
Flicker Frequency	Description to the Faults
1	Error occurs when the motor coil current exceeds the drive's current limit.
2	Voltage reference error in the drive
3	Parameters upload error in the drive
4	Error occurs when the input voltage exceeds the drive's voltage limit.

## 8. Appearance and Installation Dimensions



## 9. Typical Connection

Here is the typical connection of 2DM860.





## **11. Processing Methods to Common Problems and**

### **Faults**

#### **11.1 Power on power light off**

- No power input, please check the power supply circuit. The voltage is too low.

#### **11.2 Power on red alarm light on**

- Please check the motor is connected with the drive.
- The stepper digital drive is over voltage or under voltage. Please lower or increase the input voltage.

#### **11.4 After input pulse signal but the motor not running**

- Please check the input pulse signal wires are connected in reliable way.
- Please make sure the input pulse mode is corresponding with the real input mode.
- The Driver is disabled.