2-Phase Stepping Motor Driver

2DM542

OPERATING MANUAL

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Rev. A

Introduction

This product is a high-performance micro-stepping driver.

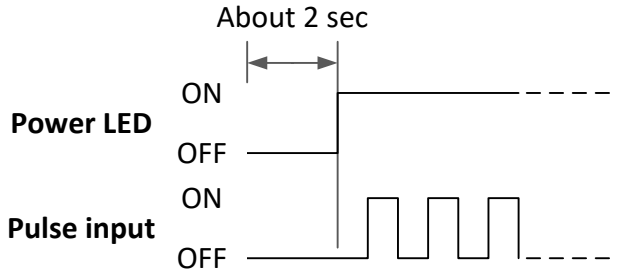
- **Smooth driver**
  By using micro-stepping, this driver can achieved low-vibration and low-noise.
- **Built-in overheat protection**
  A driver's internal temperature in excess of 70˚C (158˚F) trigger overheat protection, and the driver will stop working automatically.
- **Adjustable operating current**
  A digital switch adjusts the level of motor current during operation.
- **Bio-polar drive**
  By using bio-polar drive, this driver is powerful than uni-polar driver and only needs four wires connected to the stepping motor.
- **Automatic reduce current**
  In the stop state, the driver will reduce the current automatically to limit the heat generated by the motor and driver.

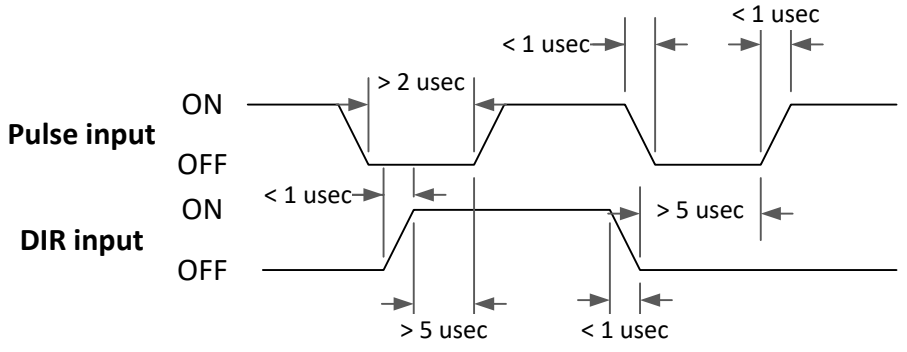
Specifications

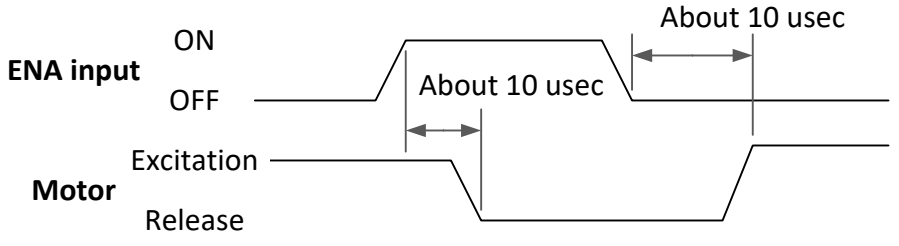
	Min	Typical	Max
Supply Voltage (VDC)	24	36	48
Output Current (A_{PEAK})	1.0	-	4.2
Logical Input Current (mA)	7	10	16
Input Frequency (KHz)	0	-	200
Low-Active Required Time	2.5	-	-

Operation Environment	Ambient temperature	0 to +65˚C (+32 to +149˚F) (non-freezing)
	Humidity	80% or less (non-condensing)
	Surrounding atmosphere	No corrosive gas, dust, water or oil
Storage Environment	Ambient temperature	-10 to +80˚C (+14 to +176˚F) (non-freezing)
	Humidity	80% or less (non-condensing)
	Surrounding atmosphere	No corrosive gas, dust, water or oil
Vibration	5.9 m/s^2 or less	
Mass	0.26 Kg	

- **Timing chart**

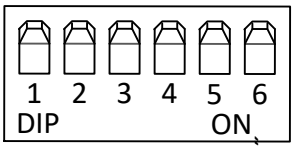






Setting

By switching the following two DIP-SWITCH, user can change the output current and micro-steps of driver.



SW-1

- **TEST Function**

SW **1**	Function
ON	Self Test
OFF	RUN (Normal Operation)

- **PLS-DIR Mode**

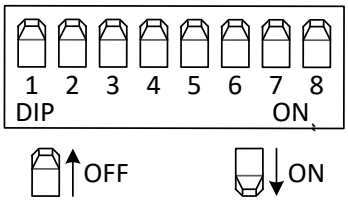
SW **2**	Function
ON	CW & CCW (2-pulse input type)
OFF	Pulse & Direction (1-pulse input type) (Normal Operation)

- **Pulse Count Method**

SW **3**	Function
ON	Down-Edge Active
OFF	Up-Edge Active (Normal Operation)

- **Smoothness (Recommend to use Level-0 Normal Operation)**

SW **4**	SW **5**	Smoothness Level
ON	***ON***	3 (Strong effect)
OFF	***ON***	2 (Middle effect)
ON	OFF	1 (Low effect)
OFF	OFF	0 (Normal Operation)



SW-2

- **Current Set**

SW **1**	SW **2**	SW **3**	Current (A_{RMS})	Current (A_{PEAK})
ON	***ON***	***ON***	0.71 A	1.00 A
OFF	***ON***	***ON***	1.04 A	1.46 A
ON	OFF	***ON***	1.36 A	1.91 A
OFF	OFF	***ON***	1.69 A	2.37 A
ON	***ON***	OFF	2.03 A	2.84 A
OFF	***ON***	OFF	2.36 A	3.31 A
ON	OFF	OFF	2.69 A	3.76 A
OFF	OFF	OFF	3.0 A	4.20 A

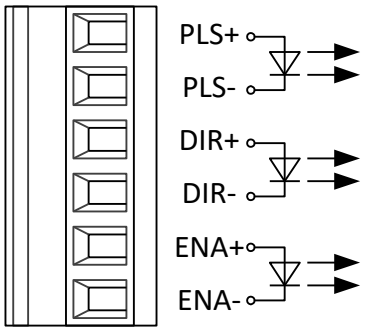
- **Reduce Current Function**

SW **4**	Function
ON	Maintain full current in the stop state
OFF	Automatically reduce current in the stop state

- **Micro-Steps (for 1.8˚ basic step)**

SW **5**	SW **6**	SW **7**	SW **8**	Steps/Rev
OFF	***ON***	***ON***	***ON***	400
ON	OFF	***ON***	***ON***	800
OFF	OFF	***ON***	***ON***	1600
ON	***ON***	OFF	***ON***	3200
OFF	***ON***	OFF	***ON***	6400
ON	OFF	OFF	***ON***	12800
OFF	OFF	OFF	***ON***	25600
ON	***ON***	***ON***	OFF	1000
OFF	***ON***	***ON***	OFF	2000
ON	OFF	***ON***	OFF	4000
OFF	OFF	***ON***	OFF	5000
ON	***ON***	OFF	OFF	8000
OFF	***ON***	OFF	OFF	10000
ON	OFF	OFF	OFF	20000
OFF	OFF	OFF	OFF	25000

Connection



- **Control signal**
  This terminal is used for control signal.

PLS+	Photo-couple Positive	-
PLS-	Pulse signal input	Motor will run one micro-step when driver receive one pulse. Low-Active, the internal resistor is 270Ω。 Logical low is 0 ~ 0.5V ; Logical high is 4 ~ 5V. Signal width must be larger than 2.5 usec.
DIR+	Photo-couple Positive	-
DIR-	Direction signal input	Decide the rotational direction. The internal resistor is 270Ω。 Logical low is 0 ~ 0.5V ; Logical high is 4 ~ 5V. Signal width must be larger than 2.5 usec.
ENA+	Photo-couple Positive	-
ENA-	Free signal input ⚠	When this input be actived (Low-Active), the driver will shut off the output current and the motor will lose its excitation holding torque. This, however, will allow you to adjust the load position manually. Low-Active, the internal resistor is 270Ω。 Logical low is 0 ~ 0.5V ; Logical high is 4 ~ 5V. Signal width must be larger than 2.5 usec.

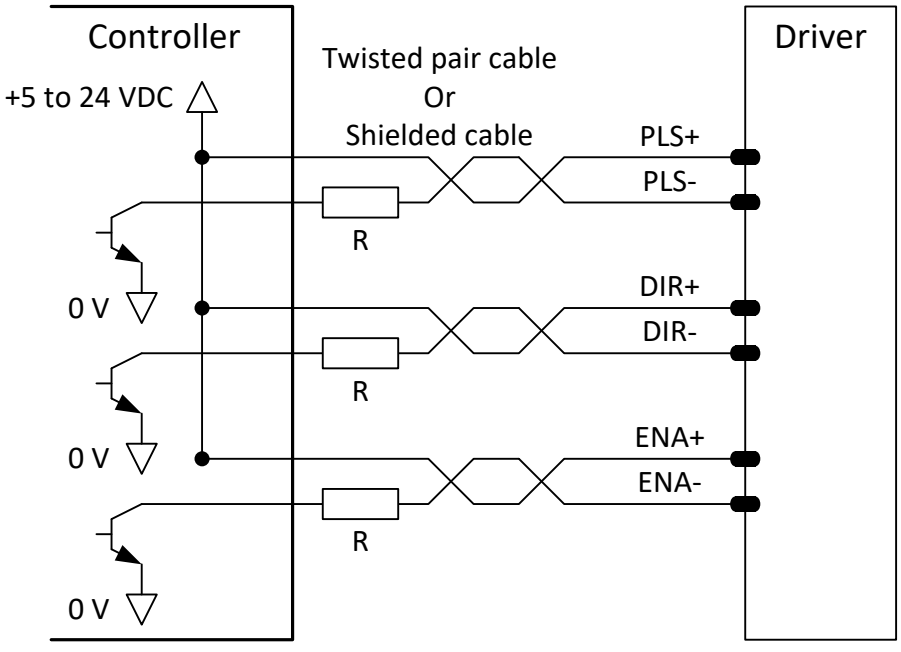
NOTE

For control signal input, 5 VDC can be directly connected and applied. If signals are used at a voltage above 5 VDC, be sure to connect an external resistor to prevent the current from exceeding 16 mA. Applying a voltage beyond 5 VDC without using an external resistor will damage the internal elements.

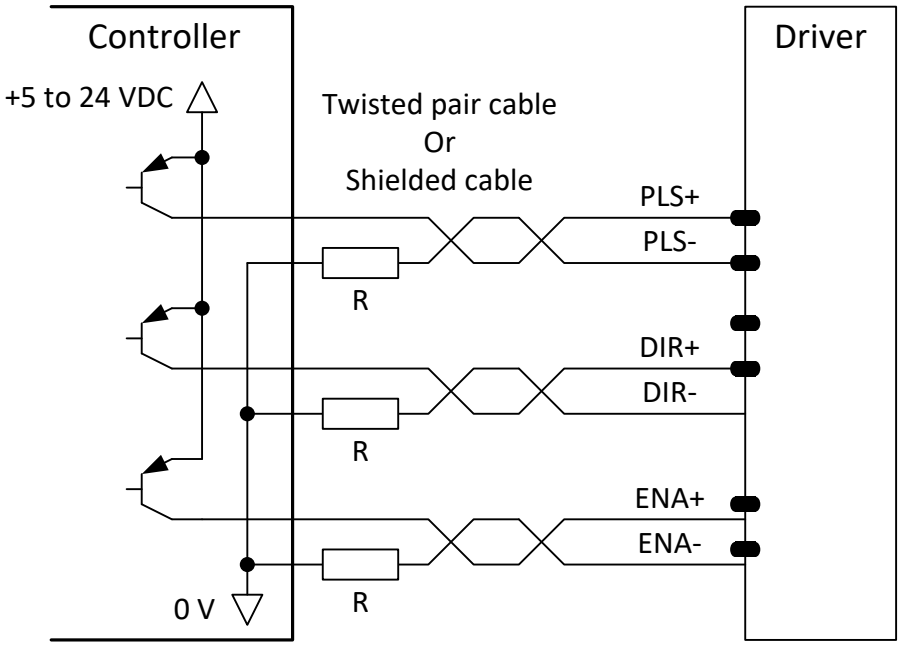
Example:

R=0, when using 5 VDC;
R=1k and > 1/8W, when using 12 VDC;
R=2k and > 1/8W, when using 24VDC.

▼ Example of connection with a current sink output circuit

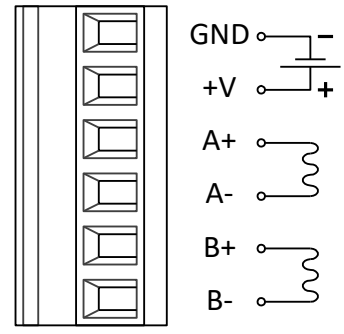


▼ Example of connection with a current source output circuit



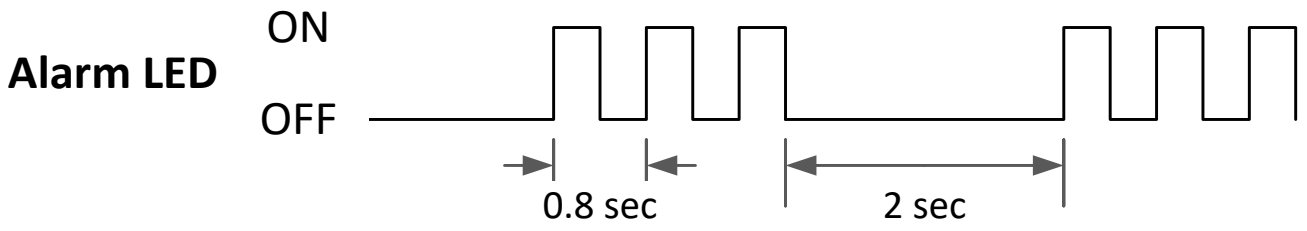
- **Power supply and Stepping-Motor connect**

  This terminal is used for supply the motor and driver power. ***Be careful not to touch the live connections.***



GND	Power Input Negative	The input power must be between 24VDC to 50VDC.
+V	Power Input Positive	
A+	Motor Phase A+	Connect the motor wires as defined.
A-	Motor Phase A-	
B+	Motor Phase B+	
B-	Motor Phase B+	

Alarm LED



Flashing Number

1	**Over Current**
2	**Driver Self-Test Error**
3	**Driver Parameters Error**
4	**Input Voltage Too Lager**

Troubleshooting

When the motor cannot be operated correctly, refer to the contents provided in this section and take appropriate action. If the problem persists, contact your nearest office.

Phenomenon	Possible cause	Remedial action
The motor is not excited. The motor's output shaft can be turned easily with the hands. (The motor equipped with an electromagnetic brake can be turned easily with the hands, once the brake is released.)	Bad connection of the motor cable.	Recheck the connections between the motor and driver. Take appropriate action and turn on the power again
	Incorrect setting of the current-adjustment switch.	Check the rated current of motor and set the switch to rated current of motor.
	ENA input is active.	Dis-active the ENA signal.
	Overheat protection is active.	Shut off the driver's power and check the cause of the problem that had triggered overheat protection. Take appropriate action and turn on the power again

Dimension