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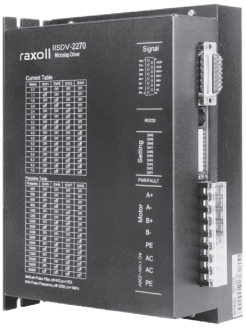
RSDV SERIES

Open-Loop Stepper Motor Driver

USER MANUAL



RSDV-2270

7.0A

110-230VAC

RoHS

Thank you for using raxoll open-loop stepper motor driver. Before using this product, please read this manual carefully to understand the necessary safety information, precautions, and operation methods. Incorrect operation can have extremely serious consequences. This product is designed and manufactured without the ability to protect personal safety from mechanical system threats. Users are advised to consider safety precautions during mechanical system design and manufacturing to prevent accidents caused by improper operation or product abnormalities. Due to product improvements, the contents of this 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 pay attention to the following signs in the manual.

Product Introduction

RSDV-2270 stepper driver, based on our 32-bit DSP processing chip platform, adopts internal PID current control algorithm design, has excellent performance.The built-in micro-subdivision technology makes the RSDV-2270 stepping driver have the characteristics of low noise, low vibration, low heating and high speed and high torque output, which can be well adapted to most applications of stepping motor. RSDV-2270 driver has built-in pulse command S-type acceleration and deceleration function and limit frequency optional function, which is set by dial code.In addition, the operation subdivision and current can be selected by dial switch, with 16 kinds of subdivision and 16 kinds of current selection; the driver integrates over-voltage, under voltage and over-current protection, and its input and output control signals are all photoelectric isolation.

Characteristics

- New 32 Bit DSP technology
- Ultra-low vibration noise
- Built-in high subdivision
- Automatic parameter power-on setting function
- Variable current control greatly reduces the heat generation of the motor.
- Automatically halve the current after the motor stopping
- Can drive 4,6,8-wire two-phase stepping motor
- Photoelectric isolated differential signal input
- Photoelectric isolation, alarm output
- 2MHz digital signal processing filter
- Voltage Range 110-230VAC
- The current setting is convenient and can be selected between 0.7-7.0 A
- Sub-set range 400-60000
- It has the protection functions of overvoltage, undervoltage and overcurrent.
- Automatically calculate the resonance point and inhibit the IF vibration
- Use the suitable motor, up to 3000rpm

Use Environment

Cooling Mode		Forced Air Cooling
Service Environment	Occasion	Can not be placed to other heating equipment, to avoid dust, oil mist, corrosive gases, humidity is too large and strong vibration sites, prohibited combustible gases and conductive dust.
	Temperature	-10°C ～ +70°C
	Humidity	40～ 90%RH
	Vibration	4.9m/s2MAX
Storage Temperature		-20°C ～ +60°C
Use Elevation		Below 1000 meters
Weight		1.6kg

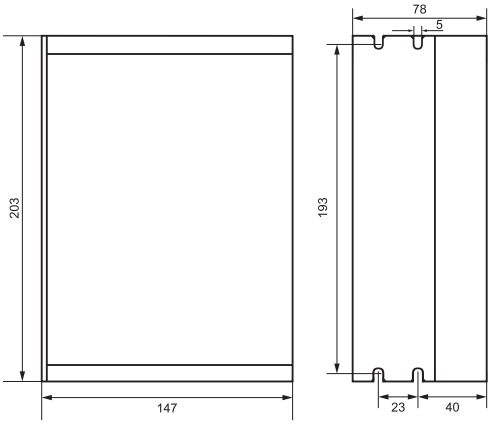
Installation Method

Please install the driver vertically or horizontally, with its front facing forward, top facing upward to facilitate cooling. During assembly, avoid drillings and other foreign matters falling inside the driver. During assembly, please use M3 screw to fix. When there is vibration source (such as a driller) close to the installation position, please use a vibrating absorber or a vibration resistant rubber gasket. When multiple drivers are installed in the control cabinet, please pay attention to reserve enough space for sufficient heat dissipation. If necessary, you can configure cooling fans to ensure good heat dissipation conditions in the control cabinet.

Electrical Characteristics

Model Code	RSDV-2270			
Explanation	Minimum Value	Typical Value	Maximal Value	Unit
Continuous Output Current	0.7	-	7.0	A
Power Supply Voltage(DC/AC)	-/110	-/220	-/230	VDC/VAC
Logic Input Current	6	10	16	mA
Logic Input Voltage	3.3	-	24	VDC
Pulse Frequency	0	200	1000	KHz
Pulse High Width	1.5	-	-	US
Insulation Resistance	100	-	-	MΩ

Dimensions



LED Status Indication

No.	GREEN / RED	LED STATUS	DRIVER STATUS
1	●	Green indicator is on for long time	Driver not enabled
2	●●	Green indicator is flickering	Driver working normally
3	●●	One green indicator and one red indicator	Driver overcurrent
4	●●●	One green indicator and two red indicators	Driver input power overvoltage
5	●●●●	One green indicator and three red indicators	The internal voltage of the driver is wrong
6	●●●●●●●●	One green indicator and seven red indicators	Motor phase loss

Driver Port Interface

Function	Grade		Definition	Remarks
Power supply input port	AC		AC power supply input	110-230VAC
	AC		AC power supply input	
	PE		Earth Wire	
Motor Connection Port	A+		Connect two terminals of motor's phase-A winding	
	A-			
	B+		Connect two terminals of motor's phase-B winding	
	B-			
Pulse Connection	1	PUL+	Pulse input interface	3.3 ~ 24V level compatible
	2	PUL-		
	3	DIR+	Direction input interface	
	4	DIR-		
Enable Connection	7	ENA+	Enable control interface	
	8	ENA-		
Input Signal	5	IN1+	Universal input 1	
	6	IN1-		
	13	IN2+	Universal input 2	
	14	IN2-		
	9	ALM+	Alarm output	24V, below 40mA
	10	ALM-		
	11	RDY+	Ready output	
	12	RDY-		
	15	NC	No definition	

Power Supply Input

RSDV-2270 has over-voltage, under-voltage, and over-current protection. Its input and output control signals are optically isolated.

The driver's working power is AC power, and the input voltage range is between 110V ~ 230V. Please pay attention to confirm the local grid voltage, and do not exceed the maximum voltage of the driver.

Note:

The specifications of power supply are single-phase AC power. Please install an EMI device in front of the driver terminals to filter out electromagnetic interference from the power grid.

Current Setting

AVERAGE CURRENT	SW1	SW2	SW3	SW4
0.7A	ON	ON	ON	ON
1.1A	OFF	ON	ON	ON
1.6A	ON	OFF	ON	ON
2.0A	OFF	OFF	ON	ON
2.4A	ON	ON	OFF	ON
2.8A	OFF	ON	OFF	ON
3.2A	ON	OFF	OFF	ON
3.6A	OFF	OFF	OFF	ON
4.0A	ON	ON	ON	OFF
4.5A	OFF	ON	ON	OFF
5.0A	ON	OFF	ON	OFF
5.4A	OFF	OFF	ON	OFF
5.8A	ON	ON	OFF	OFF
6.2A	OFF	ON	OFF	OFF
6.6A	ON	OFF	OFF	OFF
7.0A	OFF	OFF	OFF	OFF

DIP SW1, SW2, SW3 , SW4 are used to set current which is output from driver to motor.

Generally, the current is set to not exceed the rated current of the motor (effective value). If your system has high request to the heating, please decrease the current properly to lower the motor's heating.

Microstep Setting & IO Table

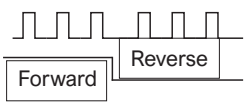
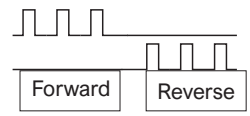
STEPS/REV.	SW5	SW6	SW7	SW8
400	ON	ON	ON	ON
500	OFF	ON	ON	ON
600	ON	OFF	ON	ON
800	OFF	OFF	ON	ON
1000	ON	ON	OFF	ON
1200	OFF	ON	OFF	ON
2000	ON	OFF	OFF	ON
3000	OFF	OFF	OFF	ON
4000	ON	ON	ON	OFF
5000	OFF	ON	ON	OFF
6000	ON	OFF	ON	OFF
10000	OFF	OFF	ON	OFF
12000	ON	ON	OFF	OFF
20000	OFF	ON	OFF	OFF
30000	ON	OFF	OFF	OFF
60000	OFF	OFF	OFF	OFF

DIP SW5, SW6, SW7, and SW8 are used to set the pulse per revolution required by the motor.

Motor speed = command pulse frequency ÷ pulse per revolution
Motor stroke = number of command pulses ÷ pulse per revolution

PUL,DIR Port

The signal interface of standard RSDV series driver is pulse-shaped, and the RSDV-2270 can receive two types of pulse command signals. The upper controller can be the pulse signal generating device, such as PLC, MCU, control card and controller.
The pulse level that RSDV-2270 driver can be used: 3.3V-24V (no need to connect resistor)

Pulse and Direction (PUL + DIR)	
Double Pulse (CW + CCW)	

Input IO Signal: IN1, IN2

IN1, IN2 are input signals with optocoupler isolation and can accept differential or single-ended switch value inputs. This signal is the input logic and input pin of the driver, which increases the trigger condition of the driver motion.

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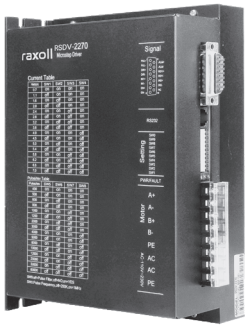

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ENA Port

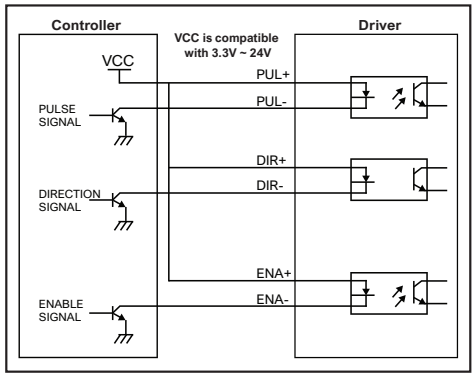
By default,when the internal optocoupler is off, the driver outputs current to the motor. When the internal optocoupler is on, the driver will cut off the current of each phase of the motor to make the motor free, and the step pulse will not be responded. When the motor is in an error state, it is automatically turned off. The level logic of the enable signal can be set to the opposite.

Output IO Signal: ALM, RDY

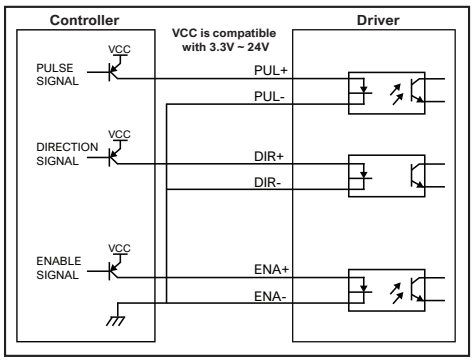
ALM and RDY are logic output pins of the driver. By default, they are defined as ALM alarm output and RDY ready signal output. The alarm state and ready state of the driver can be output to the external upper computer system. The output signal can also be defined as other logic outputs.

Connections to Control Signal

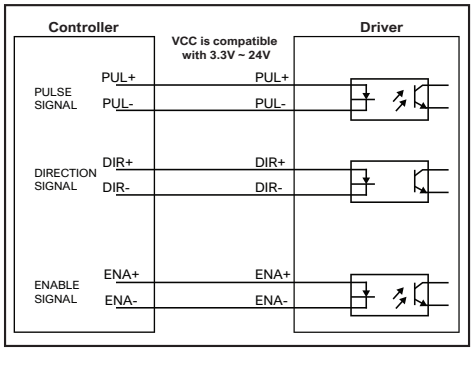
❯ Connections to Common Anode



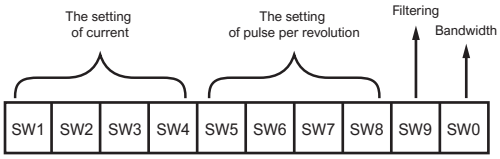
❯ Connections to Common Cathode



❯ Connections to Differential Signal



DIP Switches



Filter Selection

DIP SW9 is used to select the pulse smoothing filter function of the driver.
OFF means that the driver's internal S-type pulse smoothing function is not applied when the driver receives an external command.
ON means that when the driver receives an external command, the internal S-type pulse smoothing function of the driver is added.

Bandwidth Selection

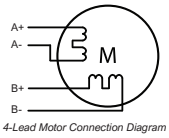
DIP SW0 is used to select the input pulse frequency range of the driver.
OFF means that the maximum frequency of the external pulse received by the driver is 200KHz.
ON means that the maximum frequency of the external pulse received by the driver is 1MHz.

4, 6 and 8 Lead Motor Connections

The RSDV-2270 can drive any 2-phase and 4-phase hybrid stepping motors.

❯ Connections to 4-Lead Motors

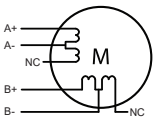
4 lead motors are the least flexible but easiest to wire. Speed and torque will depend on winding inductance. In setting the Driver output current, multiply the specified phase current by 1.4 to determine the peak output current.



4-Lead Motor Connection Diagram

❯ Connections to 6-Lead Motors (Half Coil Configurations)

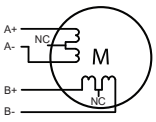
The half coil configuration uses 50% of the motor phase windings. This gives lower inductance, hence, lower torque output. Like the parallel connection of 8 lead motor, the torque output will be more stable at higher speeds. This configuration is also referred to as half chopper. In setting the Driver output current multiply the specified per phase (or unipolar) current rating by 1.4 to determine the peak output current.



6-Lead Motor Half Coil (High Speed) Connection Diagram

❯ Connections to 6-Lead Motors (Full Coil Configurations)

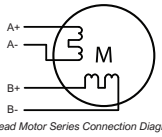
The full coil configuration on a six lead motor should be used in applications where higher torque at lower speeds is desired. This configuration is also referred to as full copper. In full coil mode, the motors should be run at only 70% of their rated current to prevent over heating.



6-Lead Motor Full Coil (High Torque) Connection Diagram

❯ Connections to 8-Lead Motors (Series Connection)

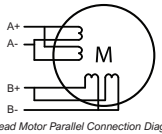
A series motor configuration would typically be used in applications where a higher torque at lower speeds is required. Because this configuration has the most inductance, the performance will start to degrade at higher speeds. In series mode, the motors should also be run at only 70% of their rated current to prevent over heating.



8-Lead Motor Series Connection Diagram

❯ Connections to 8-Lead Motors (Parallel Connection)

An 8 lead motor in a parallel configuration offers a more stable, but lower torque at lower speeds. But because of the lower inductance, there will be higher torque at higher speeds. Multiply the per phase(or unipolar) current rating by 1.96, or the bipolar current rating by 1.4, to determine the peak output current.



8-Lead Motor Parallel Connection Diagram

*__NEVER__ disconnect or connect the motor while the power source is energized.

Common Faults and Troubleshooting

Phenomenon	Possible Situations	Solutions
Motor does not work	Power indicator is off	Check the power supply circuit for normal power supply
	The motor rotor is locked but the motor does not work	Pulse signal is weak; increase the signal current to 7-16mA
	The speed is too slow	Select the right micro-stepping
	Driver is protected	Solve the alarm and re-power
	Enable signal problem	Pull up or disconnect the enable signal
	Command pulse is incorrect	Check whether the upper computer has pulse output
The steering of motor is wrong	The rotary direction of motor is reverse	Adjust the DIP SW5
	The motor cable is disconnected	Check the connection
	The motor has only one direction	Pulse mode error or DIR port damaged
Alarm indicator is on	The motor connection is wrong	Check the motor connection
	The motor connection and encoder connection are wrong	Check the sequence of encoder connection
	The voltage is too high or too low	Check the power supply
The position or speed is wrong	The signal is disturbed	Eliminate interference for reliable grounding
	The command input is incorrect	Check the upper computer instructions to ensure the output is correct
	The setting of Pulse per revolution is wrong	Check the DIP switch status and correctly connect the switches
The driver terminal burned up	Short circuit between terminals	Check power polarity or external short circuit
	Internal resistance between terminals is too large	Check whether there is any solder ball due to excessive addition of solder on the wire connections
The motor is out of tolerance	Acceleration and deceleration time is too short	Reduce command acceleration or increase driver filtering parameters
	Motor torque is too low	Select the motor with high torque
	The load is too heavy	Check the load weight and quality and adjust the mechanical structure
	The current of power supply is too low	Replace the appropriate power supply

Notes

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