

R130 USER MANUAL



Shenzhen Rtelligent Mechanical Electrical Technology Co., Ltd.

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1. Product Overview

Thank you for choosing the Rteelligent R series digital stepper driver.

R series stepper driver, based on TI's 32-bit DSP processing chip platform, adopts internal PID current control algorithm design, and has excellent performance. The built-in micro-segmentation technology makes the R series stepper driver have the characteristics of low noise, low vibration, low heat generation and high speed and large torque output, which can be well adapted to most applications of stepper motors.

Ranch

R130 driver has built-in pulse command S-type acceleration and deceleration function and limit frequency optional function, which is set by dialing. In addition, you can select the subdivision and current through the DIP switch. There are 16 types of subdivision and 16 types of current selection. The driver integrates overvoltage, undervoltage, and overcurrent protection. Its input and output control signals are optically isolated.

Power supply	110-230 VAC
Output current	7 Amps (average)
Current control	PID current control algorithm
Segment settings	DIP switch setting, 16 options
Speed range	Optional suitable stepper motor, up to 3000rpm
Resonance suppression	Automatically calculate the resonance point to suppress intermediate frequency vibration
Parameter adaptation	Drive initialization automatically detects motor parameters and optimizes control performance
Pulse mode	Support direction & pulse, CW / CCW double pulse, A / B orthogonal pulse input
Pulse filtering	2MHz Digital Signal Filter
Idle current	The current is automatically halved after the motor stops running

We hope that our excellent performance products can help you successfully complete your motion control project.

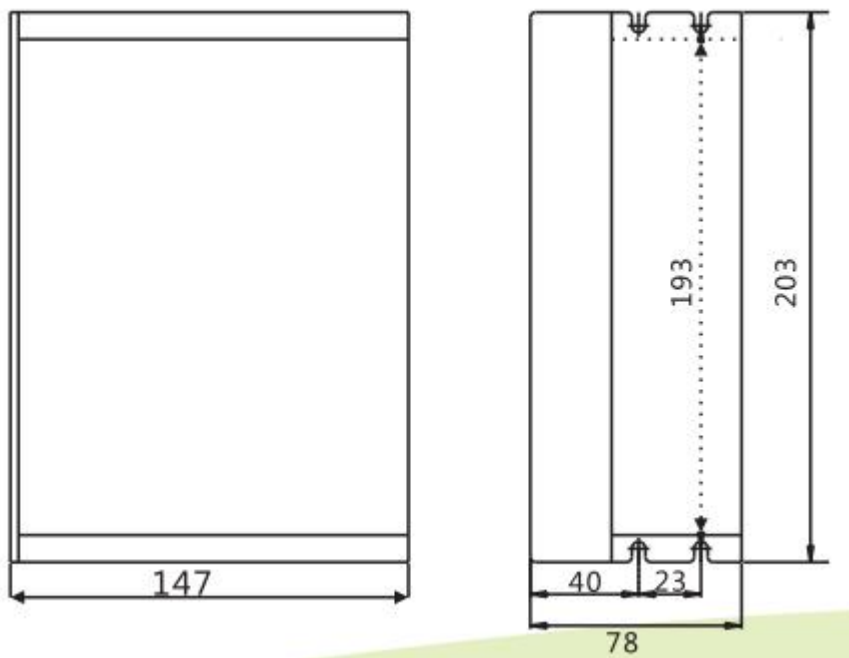
Please read this technical manual before using this product.

2. Application Environment and Installation

2.1 Environmental requirement

project	Rtelligent R130
Installation Environment	Avoid dust, oil, and corrosive environments
vibration	0.5G (4.9m / s ²) Max
Use temperature / humidity	0 °C ~ 45 °C / 90% RH or less (non-condensing)
Storage and transportation temperature	-10 °C ~ 70 °C
cooling method	Free cooling / Keep away from heat sources
waterproof level	IP54

2.2 Drive installation dimensions



2.3 Drive installation requirements

Please install the drive 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 drive.

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 drives 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.

3. Drive Port and Connection

3.1 Port function description

Features	Label		Definition	Remarks
Power input terminal	AC		AC power input	AC110~230V
	AC		AC power input	
	PE		Ground	
Motor wire terminal	U		Motor UVW three-phase	
	V			
	W			
	NC		Empty feet, not connected	
Pulse wiring	1	PUL+	Pulse input interface	3.3 ~ 24V compatible
	2	PUL-		
	3	DIR+	Direction input interface	
	4	DIR-		
Enable wiring	7	ENA+	Enable control interface	
	8	ENA-		
input signal	5	IN1+	Universal input 1	3.3 ~ 24V compatible
	6	IN1-		
	13	IN2+	Universal input 2	
	14	IN2-		
output signal	9	ALM+	Alarm Output	24V, below 40mA
	10	ALM-		
	11	RDY+	Ready for output	
	12	RDY-		
	15	NC	Empty foot, no definition	

3.2 Power supply input

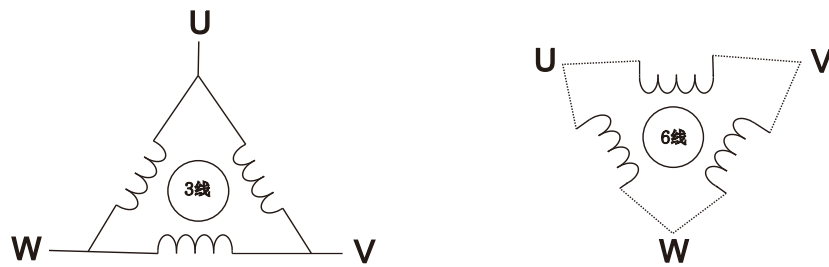
The driver's working power is AC power, and the input voltage range is between 110V ~ 230V. Please pay attention to confirm the local grid voltage, and do not exceed the maximum voltage of the driver.

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

3.3 Motor connection

R130 driver can drive low resistance and low inductance three-phase hybrid stepper motor below 130 base.

Common three-phase stepping motors have 3 and 6 wire outlets.



The R130 driver can drive two-phase hybrid stepping motors below 130 frames.

Common two-phase stepper motors have 4-, 8-, and 6-wire outlet methods.

4-wire motors have only one wiring method.

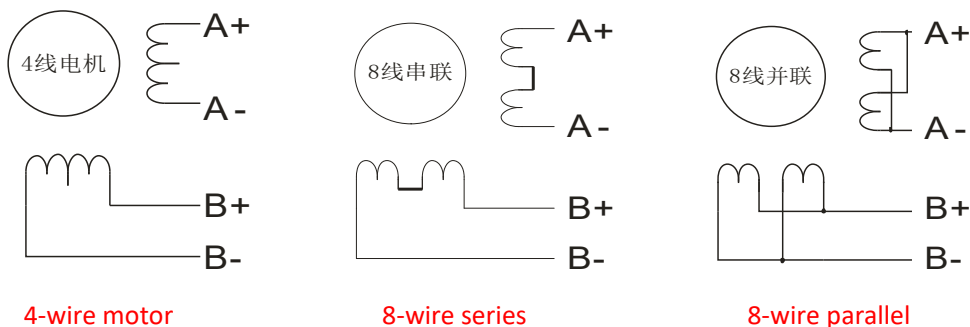
8-wire motors have two wiring modes: series and parallel:

The winding inductance of the series connection method increases, and the driver current is set to about 0.7 times before the series connection, which is suitable for low-speed occasions; The winding inductance of the parallel connection method is reduced, and the driver current is set to about 1.4 times before the parallel connection, which is suitable for high-speed applications.

6-wire motors have two wiring methods: series connection and center tap:

All the series windings are connected and the inductance is large, which is suitable for low-speed occasions;

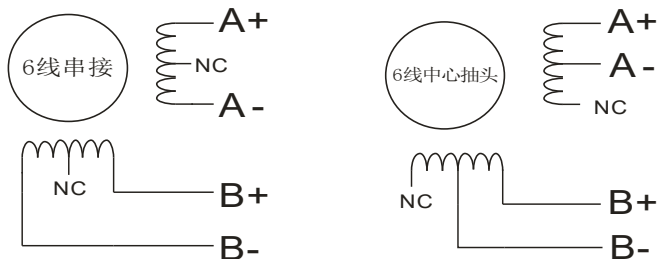
The center tap only connects half of the windings, and the inductance is small, which is suitable for high-speed applications.



4-wire motor

8-wire series

8-wire parallel



6-wire series

6-wire center shaft head

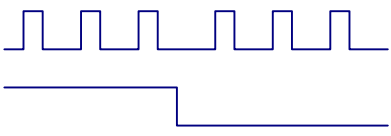
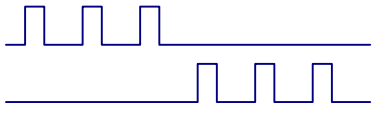
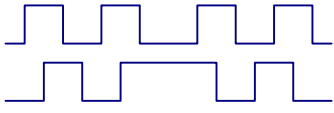
3.4 Control signal connection

3.4.1 PUL, DIR port: connection for pulse command

The signal interface of standard R series drive is switch.

The upper controller can be the pulse signal generating device, such as PLC, MCU, control card and controller.

The pulse level that R60 drive can be used: 3.3V-24V (**no need to connect resistor**)

Pulse & Direction (PUL + DIR)	
Double pulse (CW + CCW)	
Quadrature pulse (A / B quadrature pulse)	

3.4.2 ENA port: used to enable or disable

By default, the driver outputs current to the motor when the photocoupler is turned off. When the internal photocoupler is turned on, the driver will cut off the current of each phase of the motor to make the motor in a free state. At this time, the step pulse is not responded.

When the motor is in an error state, the enable is automatically disconnected. The level of the ENA signal can be set to the opposite.

3.4.3 Input IO signals: IN1, IN2

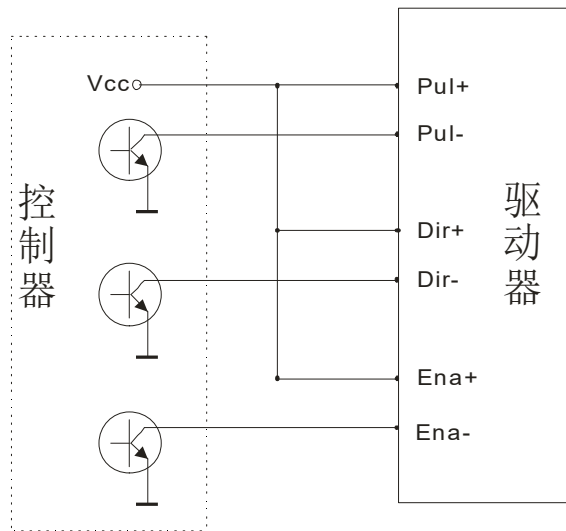
IN1, IN2 are input signals with optocoupler isolation and can accept differential or single-ended digital inputs. This signal is the input logic input pin of the driver, which increases the trigger condition of the driver motion. For specific use, please contact your engineer.

3.4.4 Output IO signal: ALM, RDY

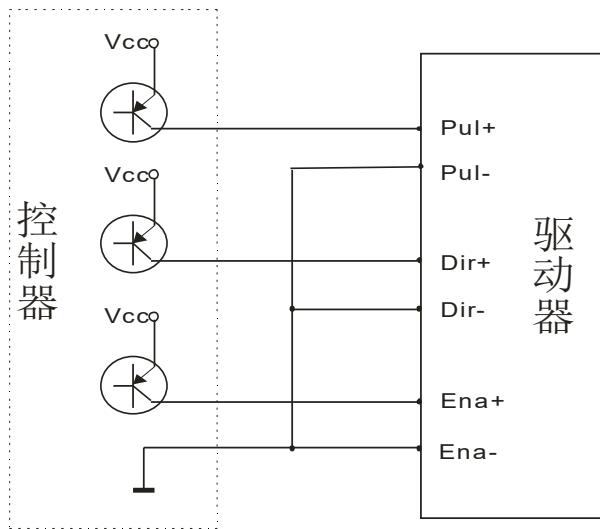
ALM and RDY are logic output pins of the driver. By default, they are defined as ALM alarm output and RDY ready signal output. The alarm state and ready state of the driver can be output to the external upper computer system. Output signals can also be defined as other logic outputs.

3.4.5 Control signal wiring example

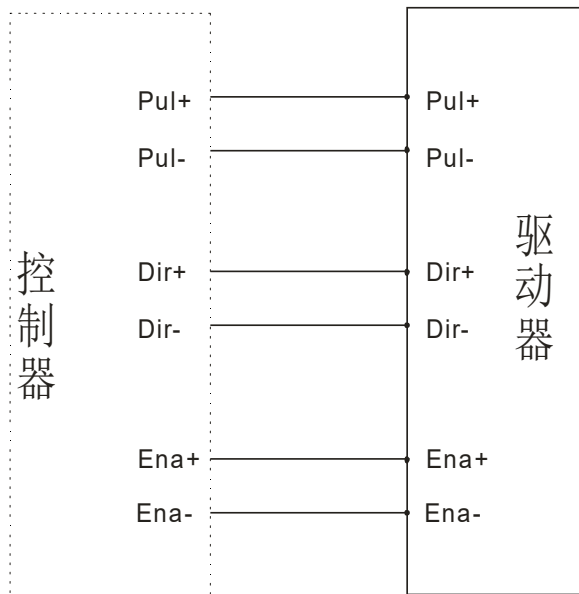
Common anode



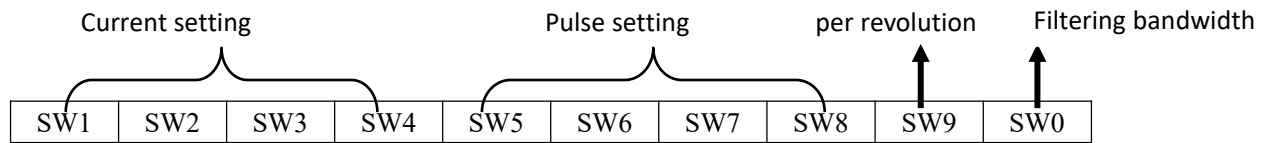
Common cathode



Difference



4. .DIP code and operation parameter settings



4.1 Current setting

Average current	SW1	SW2	SW3	SW4	Note
0.7A	on	on	on	on	Customizable other current values
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	

SW1, SW2, SW3, and SW4 are used to set the current value that the driver outputs to the motor.

Under normal circumstances, the current is set to not exceed the rated current of the motor (effective value). If your system has high requirements for heating, you can reduce the current appropriately to reduce the heating of the motor.

4.2 Pulse per revolution setting

Stepping count/revolution	SW5	SW6	SW7	SW8	Remarks
400	on	on	on	on	Customizable number of other subdivisions
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 codes SW5, SW6, SW7, and SW8 are used to set the number of pulses required for each revolution of the motor

Motor speed = command pulse frequency ÷ pulse per revolution

Motor stroke = number of command pulses per pulse per revolution

4.3 Filter selection

SW9 is used to select the pulse smoothing filter function of the driver.





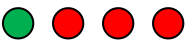
Off means that the driver's internal S-type pulse smoothing function is not applied when the driver receives an external command; on means the driver's internal S-type pulse smoothing function is added when the driver receives an external command.

4.4 Bandwidth selection

SW10 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.

5. Driver working status LED indication

LED status	Drive status
	Green indicator is on for long time Drive is not enabled
	Green indicator is flickering Drive works fine
	One green indicator and one red indicator Drive overcurrent
	One green indicator and two red indicators Drive input power overvoltage
	One green indicator and three red indicators Drive internal voltage error

6. Common Faults and Troubleshooting

Phenomenon	Possible situations	Solutions
Motor does not turn	Power light is off	Check the power supply circuit for normal power supply
	The motor locks the shaft but does not rotate	Weak pulse signal, signal current increased to 7-16mA
	Too slow	Select the right segment
	Drive protected	Power on again
	Enable signal	Pull the enable signal high or not

	problem	
	Incorrect command pulse	Check if the upper computer has pulse output
Motor turning error	Motors turn in opposite directions	Replace the motor wiring sequence or adjust the command direction
	Motor line is open	Check if the connection is bad
	The motor has only one direction	Incorrect pulse mode or damaged DIR port
Alarm indicator is on	Motor wire is incorrectly connected	Check the wiring
	Voltage is too high or too low	Check power
	Motor or drive is damaged	Replace the motor or driver
Position or speed error	Signal is disturbed	Eliminate interference, reliable grounding
	Incorrect input	Check the host computer instructions to ensure the correct output
	Pulse setting error per revolution	Check DIP switch status and connect
	Motor lost step	Check if the command speed is too large and the motor selection is small
Driver terminal burned out	Short between terminals	Check power polarity or external short circuit
	Too much internal resistance between terminals	Check if there is excessive solder added to the wire-to-wire connection
Motor stalled	Acceleration / deceleration time is too short	Reduce command acceleration or increase drive filter parameters
	Motor torque is too small	Choose a high torque motor
	Too heavy load	Check load weight and quality, adjust mechanical structure
	The current is too small	Check the dial code and increase the driver output current

7. Custom models with optional features

In order to meet the application requirements of different occasions, R130 derives related models, please customers to confirm and distinguish before ordering:

model	Features
R130 (standard)	Single pulse, 200K bandwidth, smooth filtering
R30-CCW	Matching 86 large inductance motors
R130-QEP	Double pulse mode
R130-500	Quadrature Pulse (can be used in encoder following applications)
R130-1M	Bandwidth 500KHz
R130-IO	Bandwidth 1MHz
R130-PM	IO switch mode (IO trigger fixed speed / positioning)

8. Appendix A. Guarantee Clause

A.1 Warranty period: 12 months

We provide quality assurance for one year from the date of delivery and free maintenance service for our products during the warranty period.

A.2 Exclude the following:

- Improper connection, such as the polarity of the power supply is reversed and insert/pull the motor connection when the power supply is connected.
- Beyond electrical and environmental requirements.
- Change the internal device without permission.

A.3 Maintenance process

For maintenance of products, please follow the procedures shown below:

- (1) Contact our customer service staff to get the rework permission.
- (2) The written document of the drive failure phenomenon is attached to the goods, as well as the contact information and mailing methods of the sender.

Mailing address:

Post code:

Tel.: