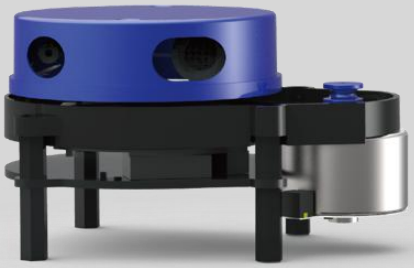
YDLIDAR X4
DATASHEET



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INTRODUCTION

YDLIDAR X4 LIDAR is a 360-degree two-dimensional laser range scanner (LIDAR) developed by Shenzhen Yuedeng Technology Co.,Ltd.. This product is based on the principle of triangulation distance measurement, together with the relevant optical, electrical, algorithm design, to achieve high-frequency high-precision distance measurement. After power on, YDLIDAR X4 start rotating and scanning clockwise. User can get range scan point cloud data through the communication interface (Serial port/USB).

PRODUCT FEATURES

- 360° Scanning Range
- High accuracy, stable performance
- 10meter Range
- Strong ability to resist environmental light interference
- Thin design, long life span
- FDA Class I Laser Safety
- Configurable Motor Speed, 6Hz~12Hz
- Maximum scan sampling frequency 5Khz

APPLICATIONS

- Home service /cleaning robot navigation and localization
- General robot navigation and localization
- Smart toy's localization and obstacle avoidance
- Environment scanning and 3D re-modeling
- General simultaneous localization and mapping (SLAM)

INSTALLATION AND SIZE

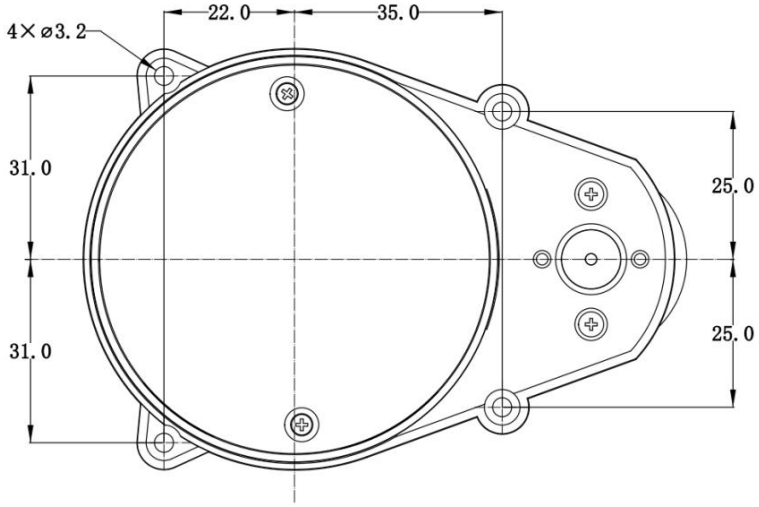


图 1 YDLIDAR X4 SIZE

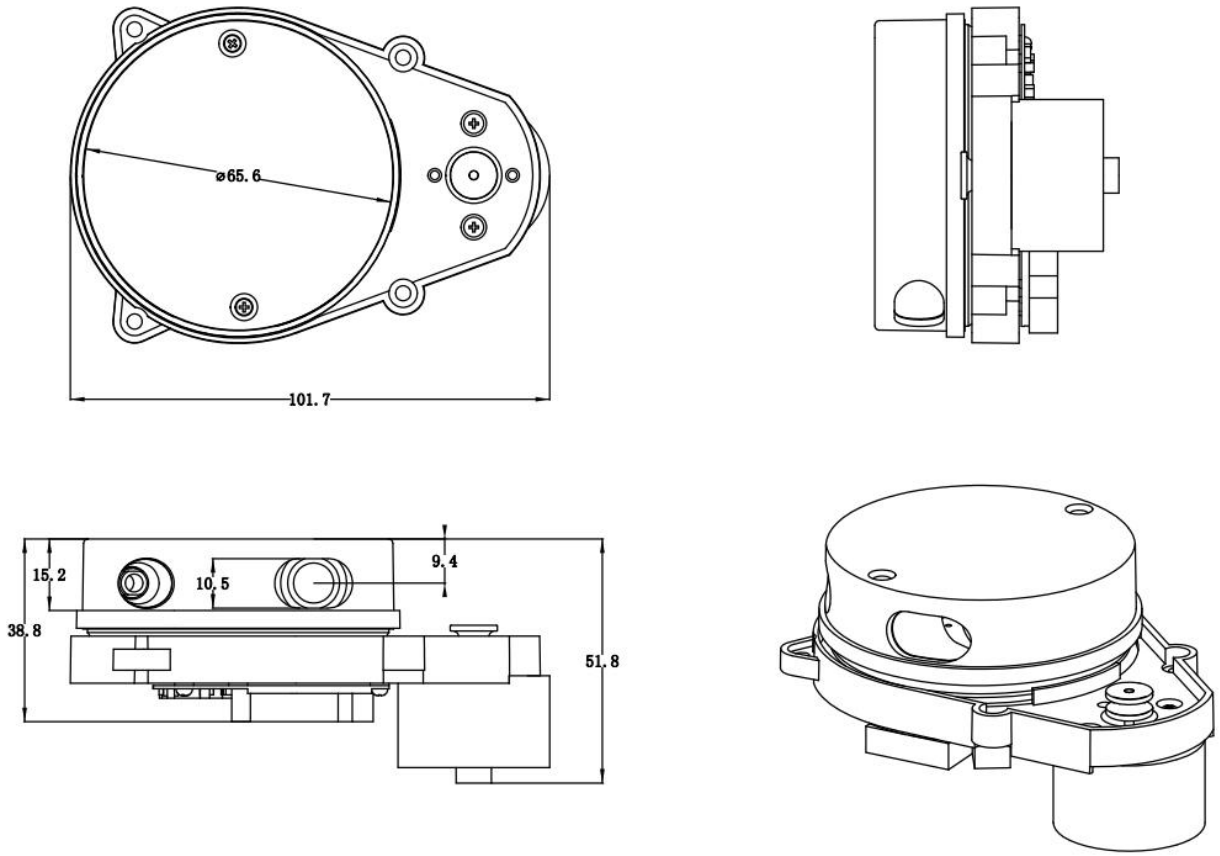


图 2 YDLIDAR X4 SIZE

SPECIFICATIONS

Measurement Performance

FIG. 1 YDLIDAR X4 MEASUREMENT PERFORMANCE

Subject	Min.	Typical	Max.	Unit	Remark
Sample Frequency	-	5000	-	Hz	5000 samples/sec
Scanning Frequency	6	-	12	Hz	PWM or voltage control
Range	0.12	-	>10	m	Indoor environment
Angular Range	-	0~360	-	Deg	-
Distance Resolution	-	<0.5	-	mm	Range<2m
		<1% of the distance			Range>2m
Angular Resolution	0.48	0.50	0.52	Deg	Frequency at 7Hz
Life Span	-	1500	-	h	

Power Supply specifications

FIG. YDLIDAR X4 POWER SUPPLY SPECIFICATIONS

Subject	Min.	Typical	Max.	Unit	Remark
Supply Voltage	4.8	5	5.2	V	If the voltage exceeds the max value, it may damage the core. Too low Voltage may affect performance and even stop ranging
Voltage Ripple	0	50	100	mV	High ripple may cause working failure
Start Current	400	450	480	mA	Relatively higher current is required at startup of the device
Sleep mode Current	280	300	340	mA	System dormancy with motor rotating
Work mode Current	330	350	380	mA	

External Interface Definition

X4provides PH2.0-8P base interface. It contains system voltage interface, data communication interface and motor control interface.

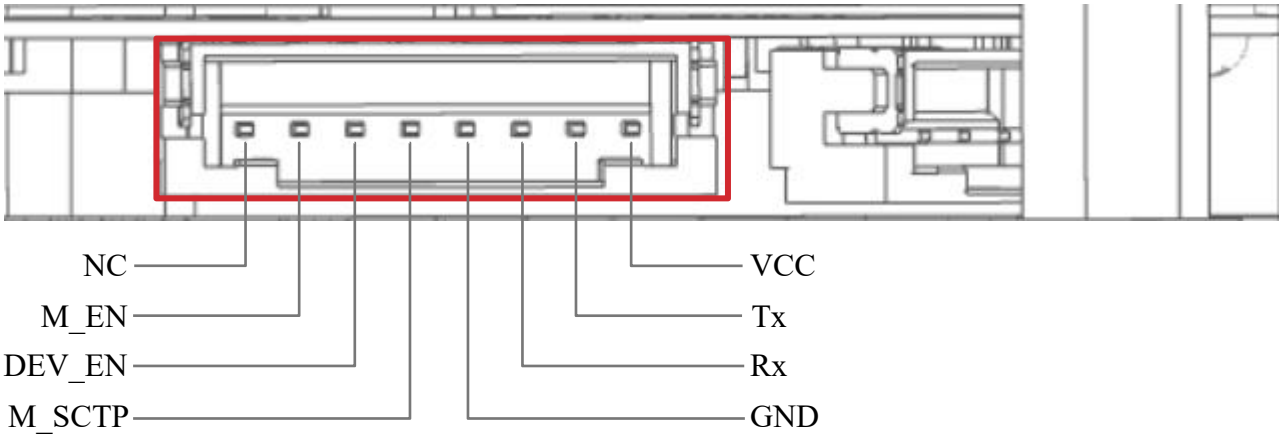


FIG. 3 YDLIDAR X4 INTERFACE DEFINITION

Pin	Type	Description	Default value	Range	Range
VCC	Power Supply	V+	5V	4.8V~5.2V	-
Tx	Output	serial port output	-	-	Data flow: lidar→peripheral
Rx	Input	serial port input	-	-	Data flow : peripheral→ lidar
GND	Power Supply	V-	0V	0V	-
M_EN	Input	Motor control	3.3V	0V~3.3V	
DEV_EN	Input	Scanning control	3.3V	0V~3.3V	
M_SCTP	Input	Motor Speed	1.8V	0V~3.3V	PWM or voltage control
NC	-	Reservation pin	-	-	-

Data Communication

The X4 uses a 3.3V serial port (UART) for communication. The user can connect the external system and the product through the physical interface on the product and communicate in real time according to the system's communication protocol to obtain the scanned point cloud data, device

information, Equipment status, and can set the device working mode. The communication shows as follows:

FIG. 4 YDLIDAR X4 SERIAL PORT SPECIFICATIONS

Subject	Min.	Typical	Max.	Unit	Remark
Baud rate	-	128000	-	bps	8bits, 1stop bit, no check bit
Output high voltage	1.8	3.3	3.5	V	>1.8V
Output low voltage	0	0	0.5	V	<0.5V

Motor Speed Control

X4 motor has motor speed control function. Computers can control the X4 motor by inputting control signals through M_EN and M_SCTR pins in the interface. M_EN is the motor enable signal, high enable;

M_SCTR is the motor speed control signal. Control speed by PWM or power voltage.

The lower the voltage is, the smaller the PWM duty cycle is, the higher the motor speed is.

At 0V / 0% duty cycle, motor at maximum speed.

For examples: Set M_EN high, M_SCTR input voltage 0V, the motor rotates at the maximum speed.

M_SCTR PWM setting has the following requirements:

FIG. 5 YDLIDAR X4 PWM CHART

Subject	Min.	Typical	Max.	Unit	Remark
PWM Frequency	-	10	-	KHz	PWM Square wave
Duty cycle range	50%	85%	100%		The smaller the duty cycle, the faster the speed

Laser Power Specification

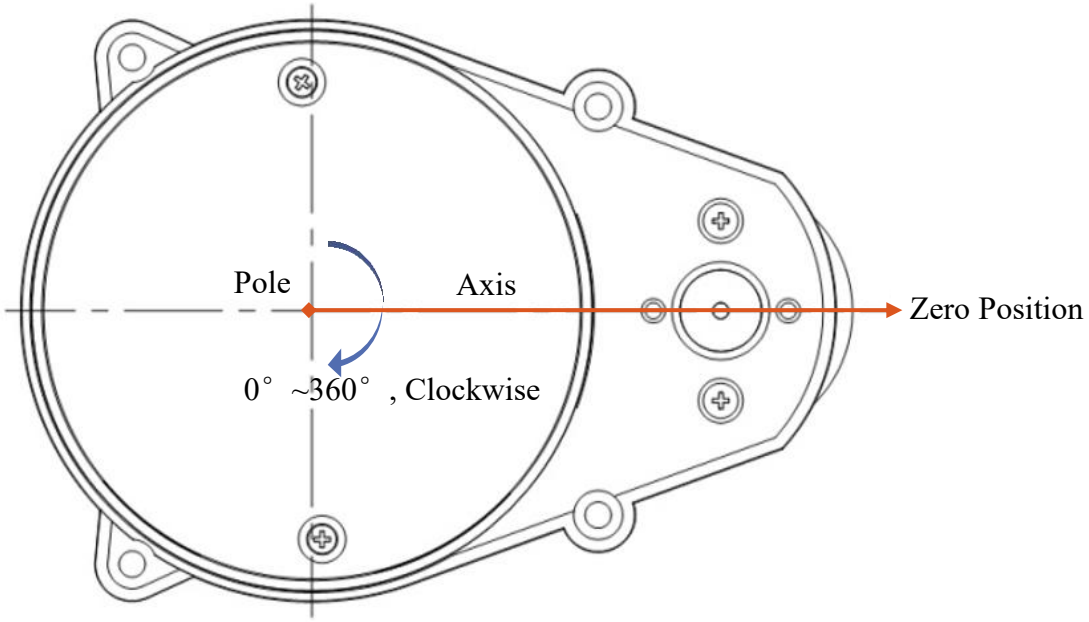
FIG. 6 YDLIDAR X4 LASER POWER SPECIFICATION

Subject	Min.	Typical	Max.	Unit	Remark
Laser wavelength	775	785	795	nm	Infrared Band Light
Laser power	-	3	5	mW	Peak power

FDA	Class I

Scanning Polar Coordinate System Definition

For secondary development, X4 defines the polar coordinate system internal. The polar coordinates are centered on the center of the X4 rotation core, the specified angle is positive clockwise and the zero angle is directly in front of the X4 motor as shown:



Other Specifications

FIG. 7 YDLIDAR X4 OTHER SPECIFICATIONS

Subject	Min.	Typical	Max.	Unit	Remark
Working temperature	0	20	40	℃	Working in a high temperature environment for a long time will reduce the life span.
Light environment	0	550	2000	Lux	For reference only
Weight	-	180	-	g	Net Weight

SOFTWARE AND SUPPORT

X4 provides rich hardware and software interfaces, it can realize motor power control, speed control, ranging frequency enable control and output control. With those, users can control the motor and the scanner core of X4. We provide 3D model of X4 and a Windows graphical coding client for users, as well as the corresponding SDK development kit and ROS development kit. Users can download softwares from the official website http://eaibot.com/.

REVISE HISTORY

Date	Ver.	Description
2017-11-29	1.0	First draft
2018-1-15	1.1	Interface revised, Tx、Rx define in FIG. 3