

电应普  
BEST SENSOR



# ***DATASHEET***

## **A09 Series Sensor Module**

<https://dypsensord.en.alibaba.com>

SHENZHEN DIANYINGPU TECHNOLOGY CO., LTD.



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# Product Description

## 1. General

The A09 sensor module uses ultrasonic sensing technology for distance measurement. The module adopts high-performance processor and high-quality components, the product is stable and reliable, and has a long service life.

The module uses a waterproof ultrasonic transducer, has a built-in high-precision ranging algorithm and power management program, with high ranging accuracy, low power consumption, long measurement distance, and small measurement angle.

The A09 module has a variety of distance sensing modes and output modes to choose from. You can choose to measure the human body or flat objects. The output can be set to PWM pulse width output (automatic or controlled), UART output (automatic or controlled) ) and switch output.

## 2. Features

- Adopts intelligent signal processing circuit, small blind zone and long measuring range
- Build-in high precision algorithm, minimum error  $< 5\text{mm}$
- Controllable measuring angle, high sensitivity and strong anti-interference ability
- Build-in true target recognition algorithm, high target recognition accuracy
- The measurement mode can be set to target the human body or flat objects
- Multiple output interface optional, PWM, UART, SWITCH
- Internal temperature compensation, stable value output from  $-15^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$
- 3.3-5.0V power input
- Static current  $< 10\mu\text{A}$
- Low power consumption design, operating current  $< 10\text{mA}$
- Anti-static electricity design in accordance with IEC61000-4-2 standard
- Operating temperature from  $-15^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$

## 3. Applications

Horizontal distance sensing

Car parking system

Robot avoidance and automatic control

Object proximity and presence awareness

# Operating Mode

The module has two measurement modes: plane and human body, which are mainly set through the software version.

The plane detection mode has a small angle and is suitable for long-distance ranging. The human body detection mode has high sensitivity and large angle, is sensitive to small targets suitable for human body ranging.

Note: The software version is owned by the company, please make a note before placing an order.

## 1. Plane distance Measurement

There are five output modes in plane mode: PWM automatic output mode, PWM controlled output mode, UART automatic output, UART controlled output, and switch output.

The plane mode is sensitive to the plane object. Built-in precision algorithm can measure the distance of the object stably at 3.5 meters.

## 2. Human Body distance Measurement

There are five output modes in human body mode: PWM automatic output mode, PWM controlled output mode, UART automatic output, UART controlled output, and switch output.

The human body mode is sensitive to human body detection. The human body target measurement is more stable. The measurement of the object in the blind zone has high stability. It can stably measure the upper body of the human body within 100cm, and can also stabilize the measurement plane object within 3.5 meters

# Module specification

## 1. Operating specification

Item	Flat Object	Human body	Unit	Remark
Operating voltage	3.3~5.0	3.3~5.0	V	DC
Static current	<10	<10	uA	
Operating current	<10	<10	mA	(1)

Duration of operating	$\leq 37$	$\leq 37$	ms	
Blind zone	0~20	0~28	cm	(2)
Measuring range of flat object	20~350	28~350	cm	(2)
Accuracy	$\pm(1+S \times 0.3\%)$	$\pm(1+S \times 0.3\%)$	cm	(2)
Temperature compensation	Support	Support	-	

Remark:

- (1) Typical data obtained by testing with a temperature of about 25°C, 65% RH humidity, a power supply of 5V, and a 100ms duty cycle.
- (2) The temperature is about 25°C, 65% RH humidity, the measured object is a 50cm×60cm flat carton, and the transducer should be as vertical as possible to the measured object.

## 2.Environment

Item	Minimum value	Typical value	Max value	Unit	Remark
Storage Temp	-25	25	75	°C	
Storage Humidity		65%	90%	RH	(1)
Operating Temp	-15	25	60	°C	
Operating Humidity		65%	80%	RH	(2)

Remark:

- (1) Environment temperature is 0-39°C, max humidity is 90%(Non-condensation)
- (2) Environment is 40-50°C, max humidity is the highest at current temperature in nature.



### 3.Electronics

Item	Minimum value	Typical value	Max value	Unit	Remark
Operating voltage	3.3	5.0	5.25	V	
Peak current	50		50	mA	Peak value
Input Ripple			50	mV	Peak value
Input Noise			100	mV	Peak value
ESD			$\pm 200/\pm 2K$	V	(1)
ESD			$\pm 4K/\pm 8K$	V	(2)

Note:

- (1) The probe shell and output pin conform to the IEC61000-4-2 standard.  
 (2) Assembly line contact static electricity  $\pm 200V$ , air static electricity  $\pm 2KV$ .

## Module Selection Instruction

The sensor module including flat object and human body distance measurement modes. The user can choose the corresponding model according to the actual application needs.

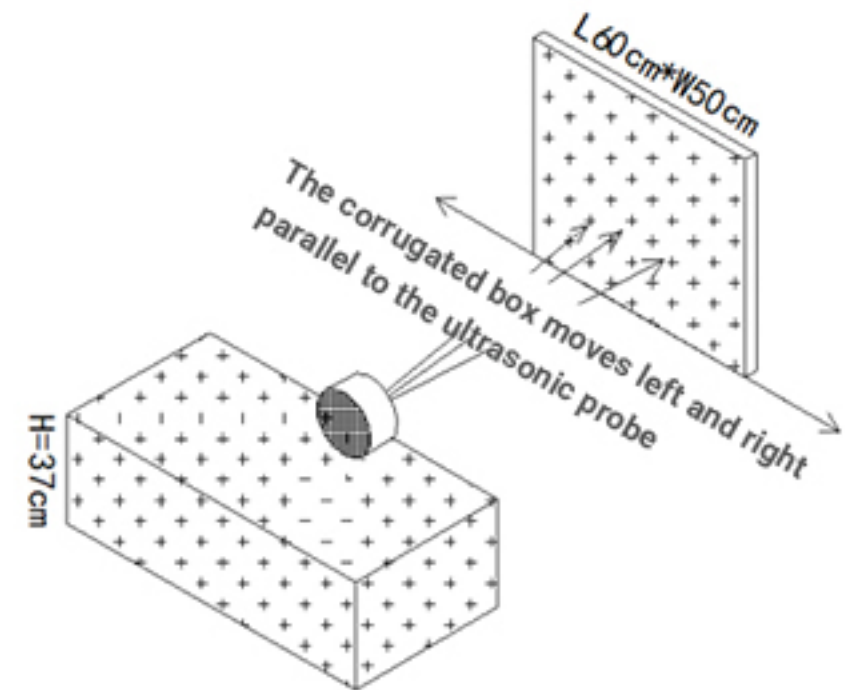
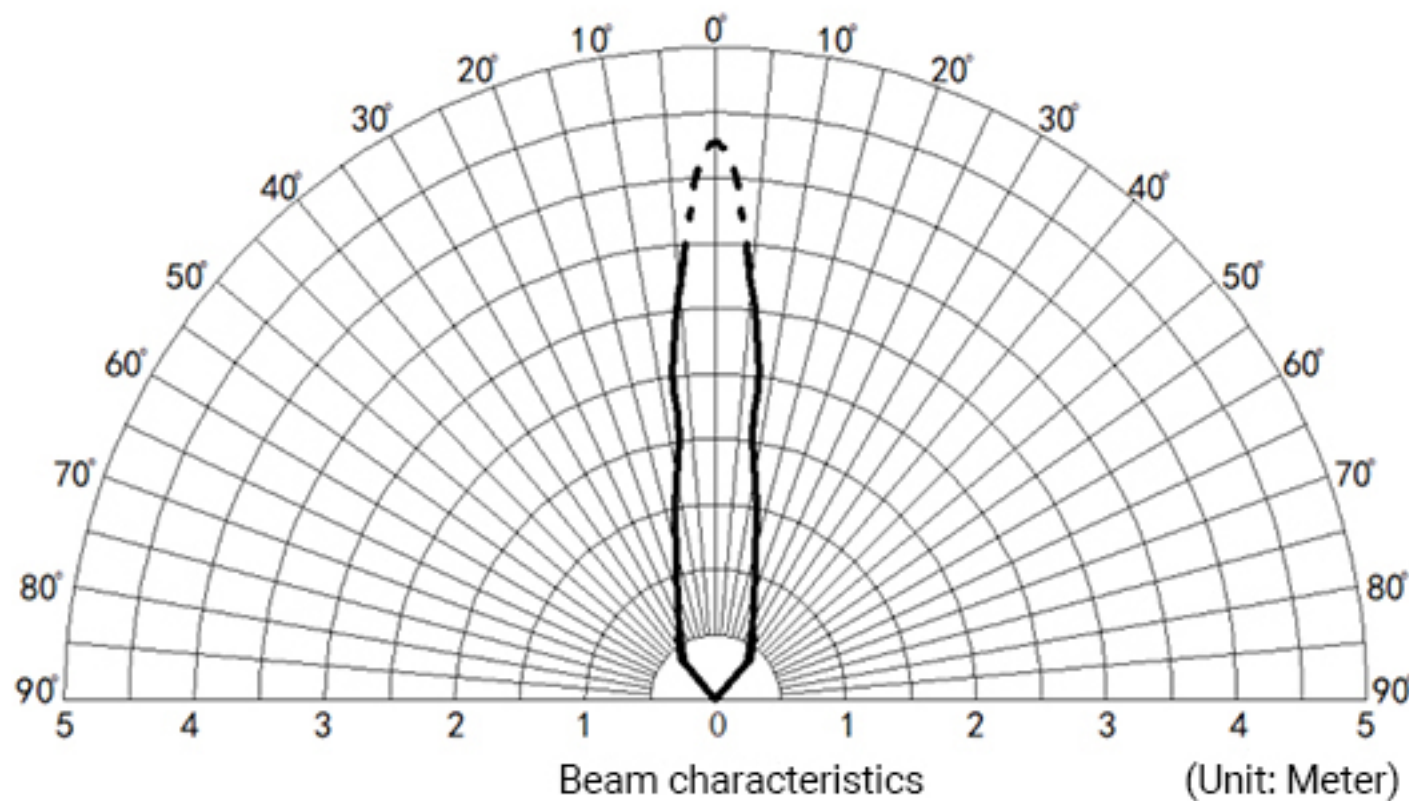
Series	Model No.	Modes	Features	Output interface	Reamrk
A09 Series	DYP-A09ANYUW-V1.0	Flat Object	Narrow beam angle, suitable for long distance measurement. 25-350cm measuring range	UART Auto	
	DYP-A09ANYTW-V1.0			UART Controlled	
	DYP-A09ANYWW-V1.0			PWM Auto	
	DYP-A09ANYMW-V1.0			PWM Controlled	
	DYP-A09ANYGDW-V1.0			Switch output	

A09 Series	DYP-A09BNYUW-V1.0	Human body	Wide beam angle, suitable for small target distance measurement. 28-350cm measuring range of flat object. Stable measurement of upper body with in 150cm distance	UART Auto	
	DYP-A09BNYTW-V1.0			UART Controlled	
	DYP-A09BNYWW-V1.0			PWM Auto	
	DYP-A09BNYMW-V1.0			PWM Controlled	
	DYP-A09BNYGDW-V1.0			Switch output	

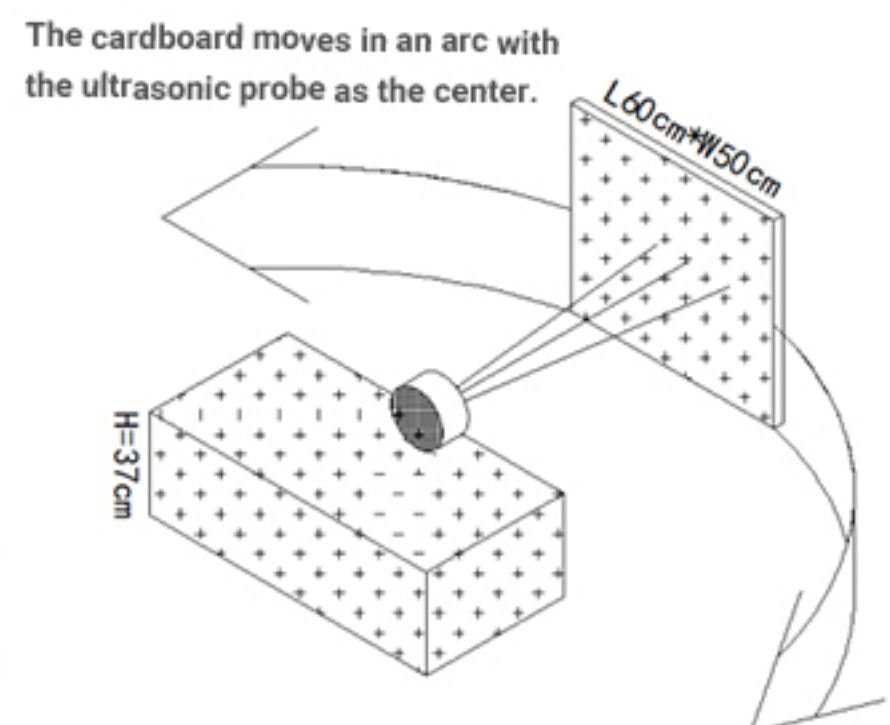
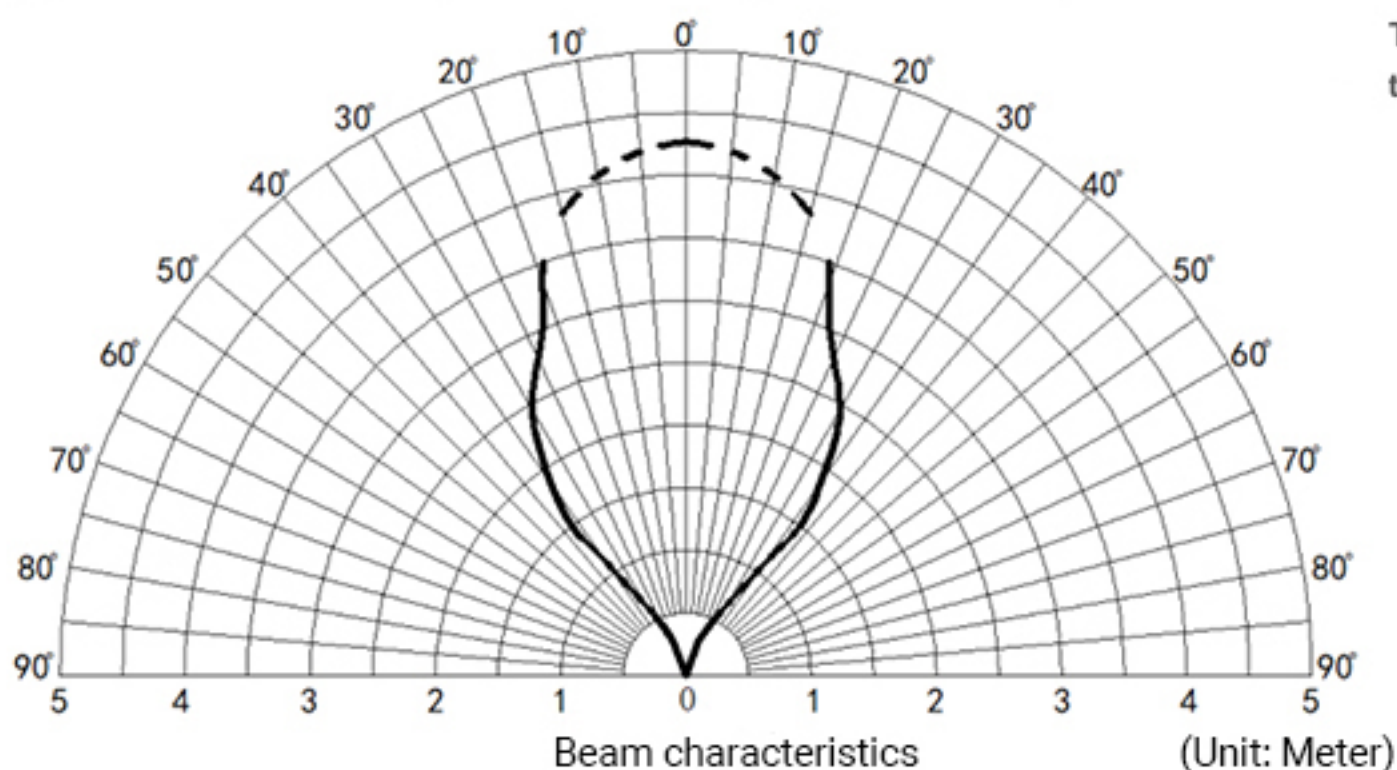
# Beam Pattern

## 1. Flat Object mode

(1) The tested object is a corrugated box perpendicular to the 0° central axis, with a length \* width of 60cm\*50cm.



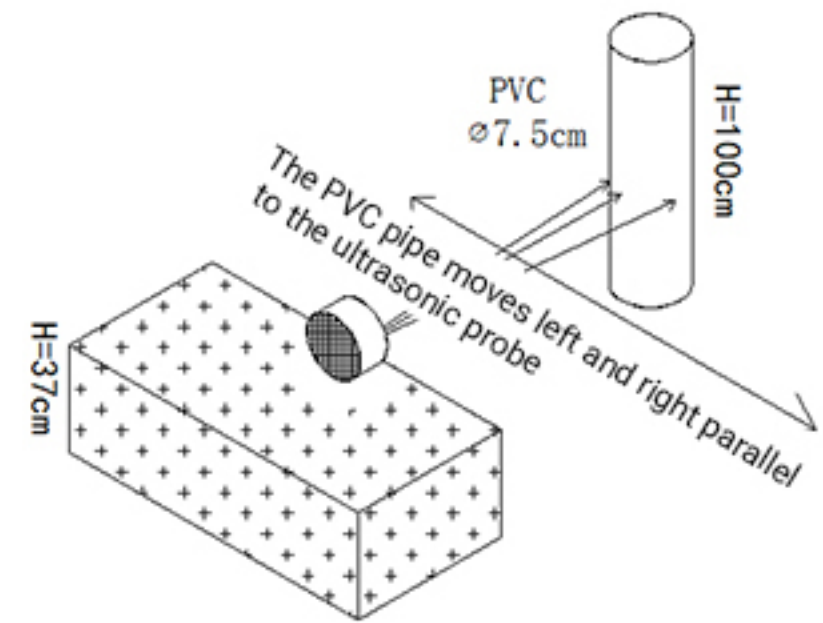
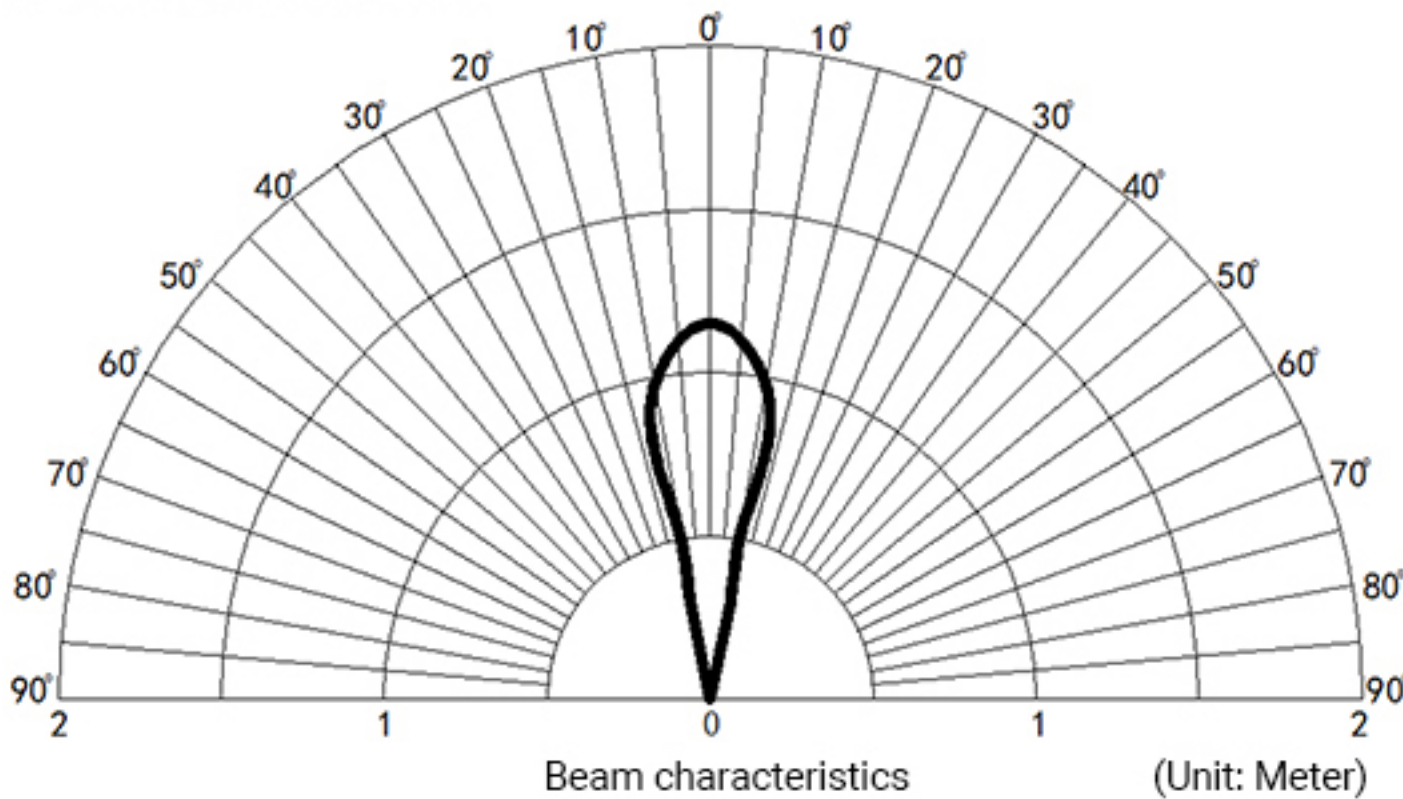
(2) The tested object is a corrugated box tangent to the arc, length \* width is 60cm\*50cm.



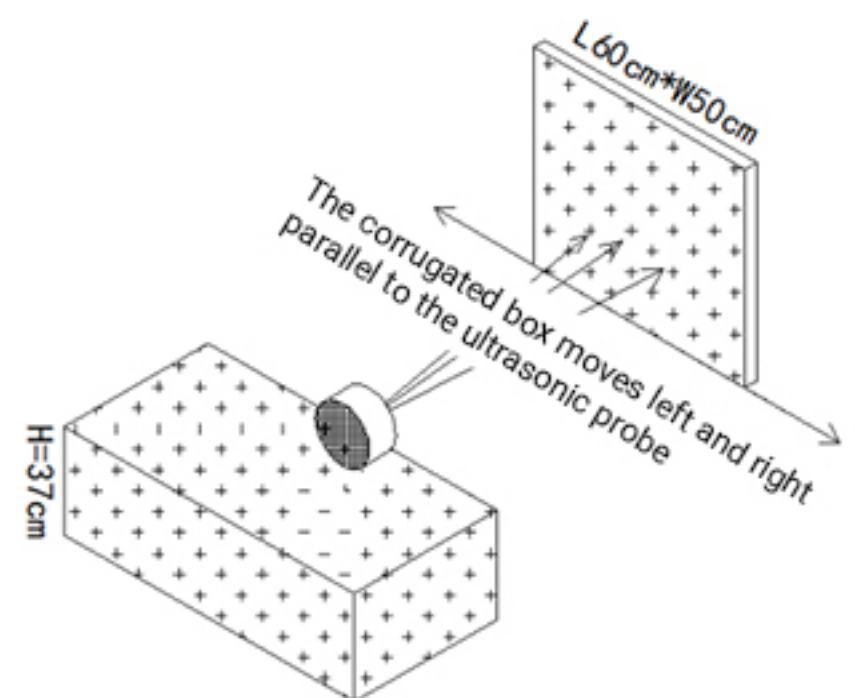
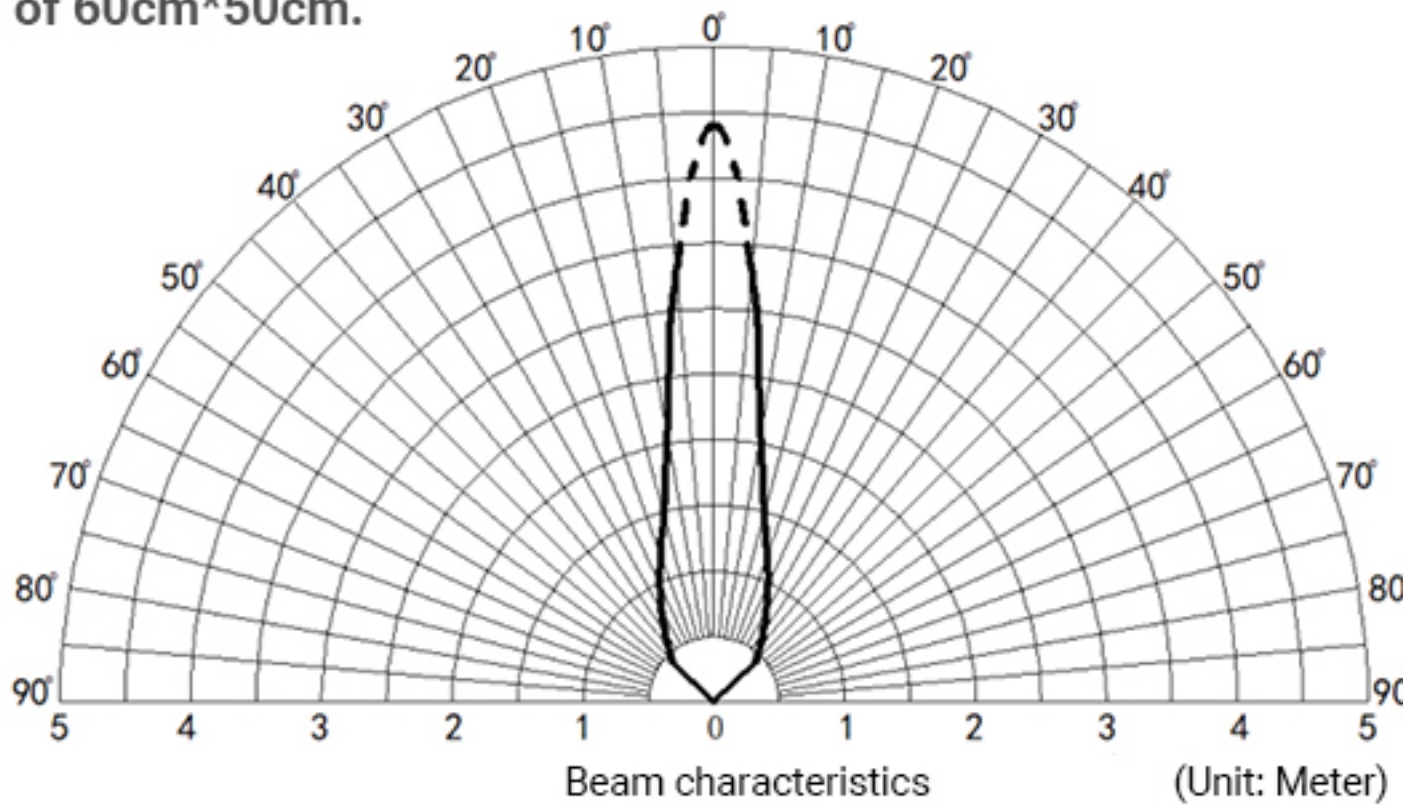


## 2. Human body Mode

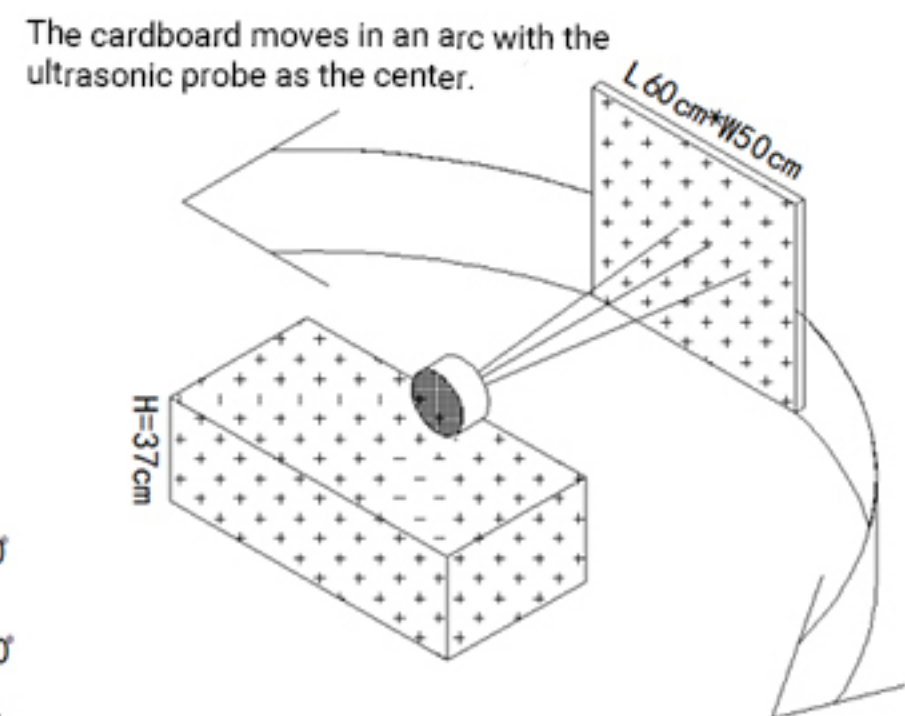
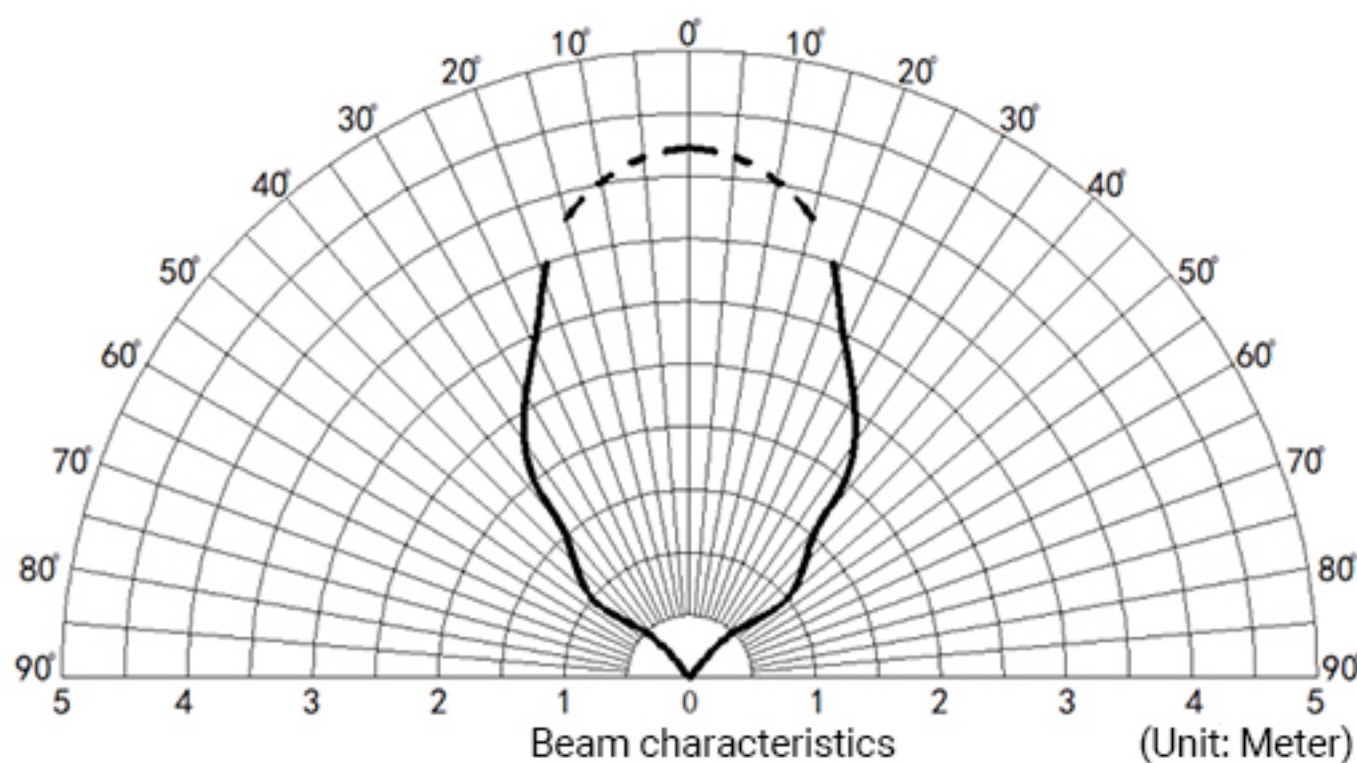
(1) The tested object is a white cylindrical tube made of PVC material, with a height of 100cm and a diameter of 7.5cm.



(2) The tested object is a corrugated box perpendicular to the 0° central axis, with a length \* width of 60cm\*50cm.



(3) The tested object is a corrugated box tangent to the arc, length \* width is 60cm\*50cm.



**Note:** The above is the laboratory test data of Dianyingpu company. In actual use, various factors such as product installation method and use environment may be different from the laboratory data. Please refer to the actual application environment test.



# Reliable testing Instruction

No.	Description	Testing condition	sample QTY	remark
1	High temperature and humidity	65°C, 85%RH, Power ON@5V, 72hrs	3	
2	low temperature	-20°C, Power ON@5V,72hrs	3	
3	High temperature and humidity storage	80°C, 80%RH, storage, 72hrs	3	
4	Low temperature storage	-30°C, storage, 72hrs	3	
5	Vibration test	10-200Hz,15min,2.0G, XYZ three axes, each axis is 0.5 hours	3	
6	Drop test	50 cm free fall, 5 times on wooden floor	3	

**Note:** After the test, the module is determined to be OK after the function test, and the performance degradation rate is  $\leq 10\%$ .

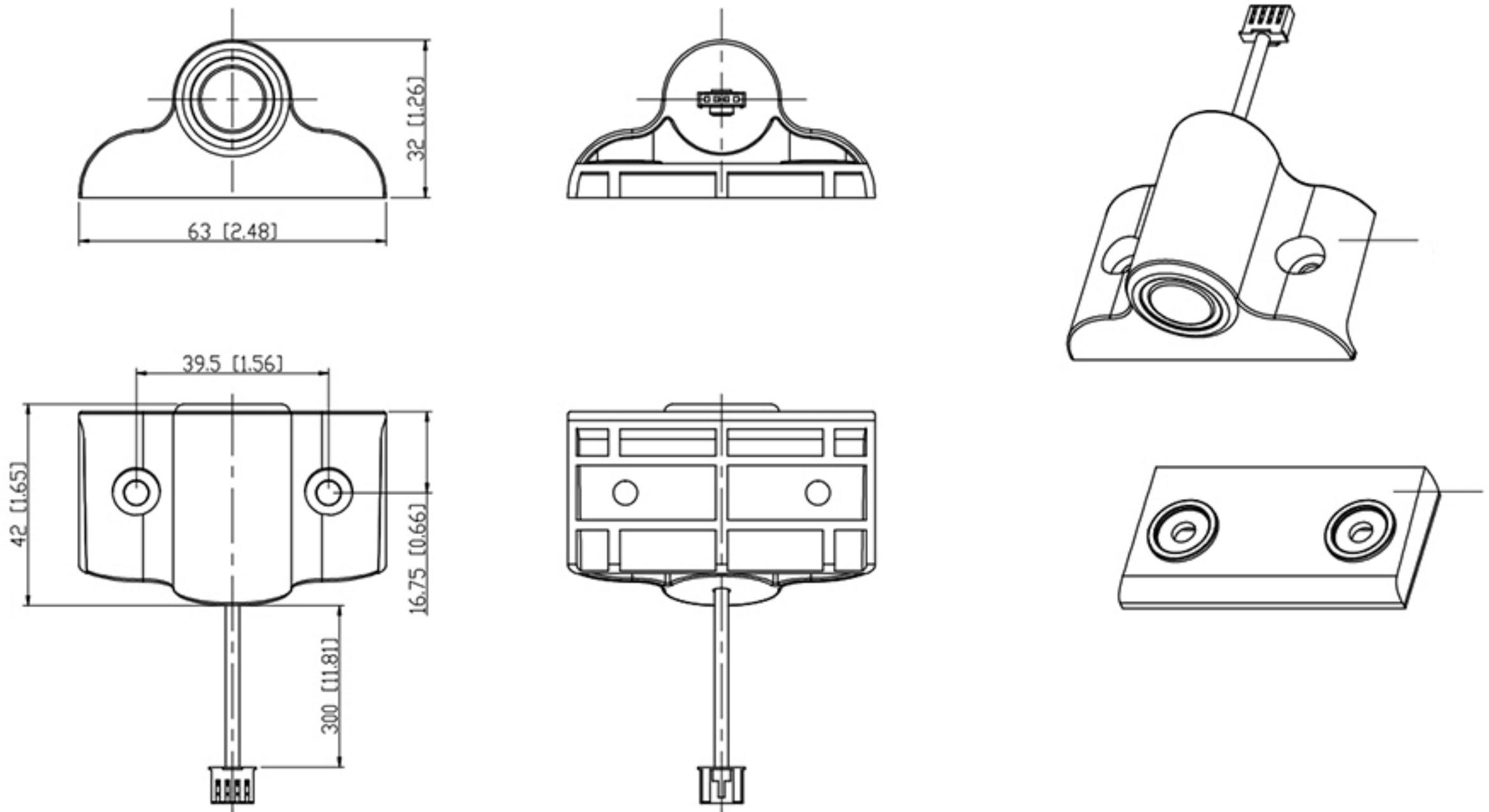
## Notice

- (1) Please pay attention to the structural tolerances when designing. Unreasonable structural design may cause temporary abnormalities in module functions.
- (2) Please pay attention to the evaluation of electromagnetic compatibility when designing. Unreasonable system design may cause malfunction of the module.
- (3) When the boundary application of the product limit parameter is involved, you can contact after sale service dept. to confirm the relevant precautions.
- (4) The company reserves the right to change this document and update the functions without prior notice.

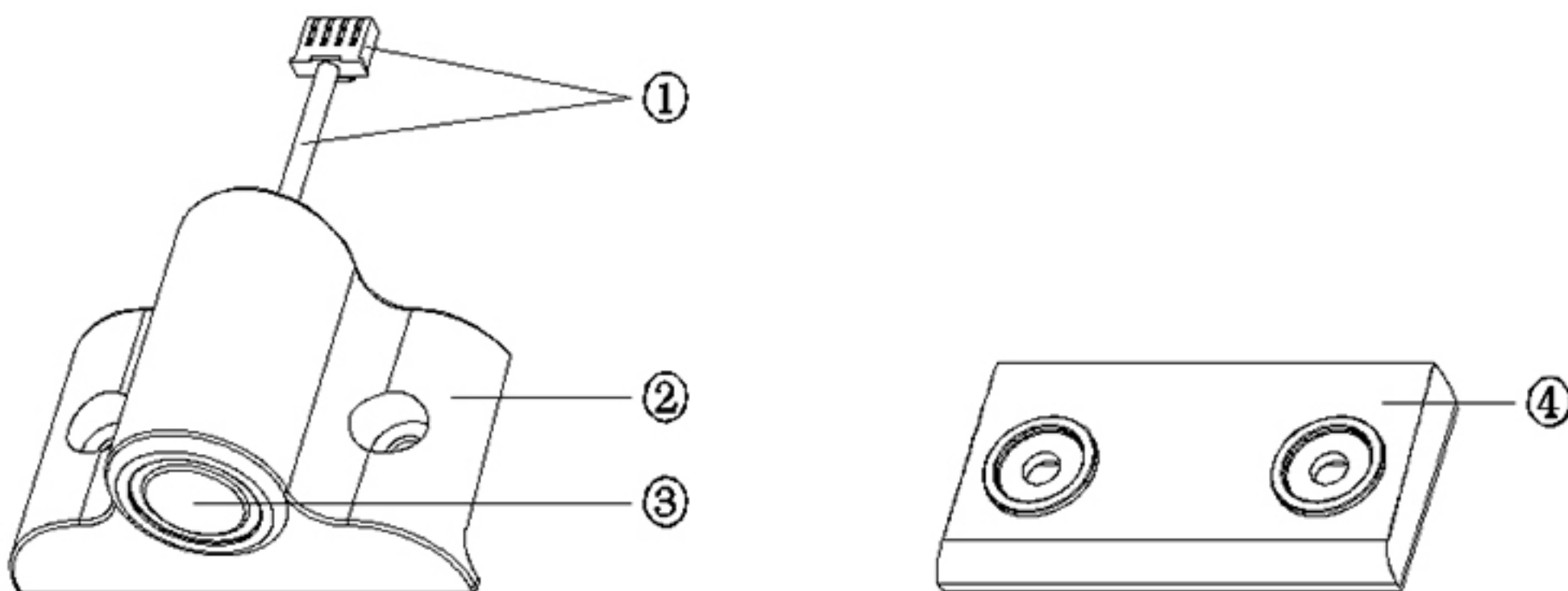


# Mechanics

## 1. Mechanical Dimensions (mm-inch)



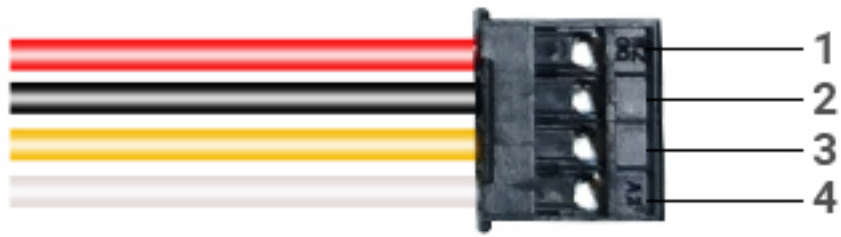
## 2. Parts Description



- ① HY2.0-4Y connector, wire length 30cm
- ② Waterproof case
- ③ Ultrasonic transducer
- ④ Support



### 3. Pin out



Pin No.	Mark	Description	Remark
①	VCC	3.3V-5V power input	
②	GND	GND	
③	RX	Functional PIN	different output modes have different functions
④	TX	Functional PIN	different output modes have different functions