电应普
BEST SENSOR

DATASHEET

A01 Series Sensor Module

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SHENZHEN DIANYINGPU TECHNOLOGY CO., LTD.

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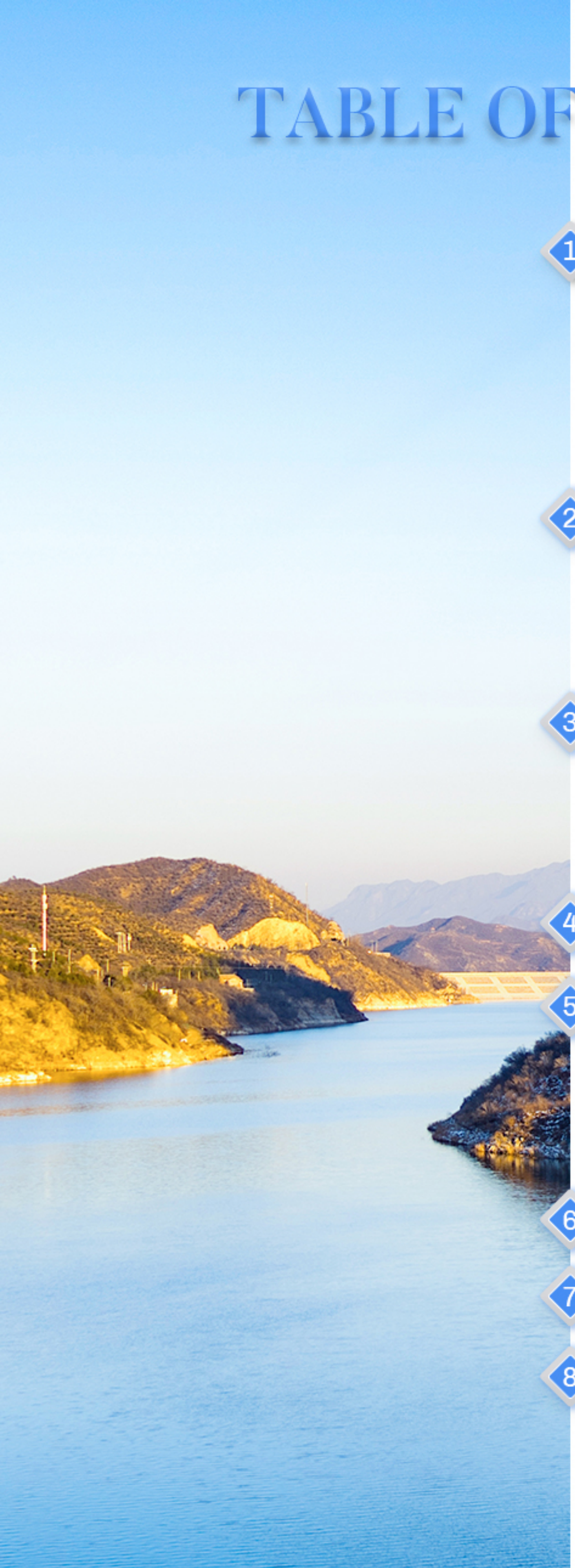


Product Description

1. General

The A01 integrated waterproof module that 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, which is highly adaptable to the working environment. The module is equipped with a dedicated bell mouth, which is suitable for larger detection range requirements. This series has a variety of different output modes, it is a simple operation high-performance, high-reliability commercial-grade functional module.

2. Features

- 3.3-5.0V power input for A01A Series
- 3.3-5.0V power input for A01B Series
- 5.0-12V power input for A01C Series
- UART Auto output
- UART Controlled output
- PWM Auto output
- PWM Controlled output
- Switch Output
- RS485 output
- Standby current lower than 10uA
- Closed integrated waterproof probe
- Internal temperature compensation
- Operating temperature from -15℃ to +60℃
- Storage temperature from -25℃ to +80℃
- Measurement accuracy ±(1cm+S*0.3%)
  （S is distance value）
- Anti static design, in accordance with IEC61000-4-2 standard

3. Advantages

High protection level

Reliable and stable data output

High anti static ability

Compact design, easy to install

Controlled output available, reduce power consumption to a minimum according to application.

High anti-interference ability

Low power consumption

High measurement accuracy

Auto output to release user’s processor

4. Applications

Horizontal distance sensing

Car parking system

Smart waste bin management system

Sewer, well water level

Fluid level monitoring

Object proximity and presence awareness

Robot avoidance and automatic control

Module Classification

According to different characteristics and advantages, the modules including three series:
A01A series, mainly used for plane ranging;
A01B series, mainly used for human body distance measurement;
The A01C series is mainly used for waste level.

1. A01A Series

A01A series modules are mainly used for plane distance measurement. It can perform targeted measurement on plane objects and is characterized by long measurement distance and high accuracy.
A01A series modules have six output modes: UART automatic output, UART controlled output, PWM automatic output, PWM controlled output, switch output, and RS485 output.

2. A01B Series

A01B series modules are mainly used for human body distance measurement. It is sensitive to human detection, and the measurement of human target is more stable, and high stability of the object measured in the blind area.Stable measurement of the upper body of the human body within 200cm(compact),within 350cm(with horn).
A01B series modules have six output modes: UART automatic output, UART controlled output, PWM processing value automatic output, PWM controlled output, switch output, and RS485 output.

3. A01C Series

The A01C series design for waste level application. Through the special algorithm to filter the border of waste bin and interfering objects, accurately measure overflow state of waste bin and containers.
A01C series modules have three output modes: UART automatic output, UART controlled output, and RS485 output.

Module Specification

1. Operating specification

Item	A01A series (Plane)	A01B Series (Human body)	A01C Series (Waste level)	Unit	Remark
Operating voltage	DC3.3~5.0	DC3.3~5.0	DC5.0~12.0	V	
Average current	＜10	＜10	＜10	mA	(1)
Blind zone	≤28	≤28	≤28	cm	
Measuring range (compact)	28～450	28～450	-	cm	(2)
Measuring range (with horn)	28～750	28～750	28～250	cm	(2)
Beam angle (compact)	-	≈75°	-	°	(3)
Beam angle (with horn)	≈40°	≈65°	-	°	(3)
Output Interface	UART AUTO UART Controlled PWM Controlled PWM Auto Switch RS485	UART AUTO UART Controlled PWM Controlled PWM Auto Switch RS485	UART Auto UART Controlled RS485		

Remarks:

(1) RS485 output power supply range of A01A and A01B is 5~12V;

(2). Typical testing data on a 100ms working cycle, 5.0V(12V of A01C series) power input at room temperature.

(3). Under room temperature, measured object is a 50cm×60cm flat carton, the transducer should be as vertical as possible.

(4). At room temperature, the reference data obtained from the test of a φ7.5cm*100cm white PVC pipe as measured object with a distance of 100cm, and the measured distance is also different at different angles.

2.Environment

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

Remark:

(1) Environment temperature is 0-39℃, max humidity is 90%(Non-condensation)

(2) Environment is 40-50℃, max humidity is the highest at current temperature in nature.

3.Electronics

Item	Minimum value	Typical value	Max value	Unit	Remark
Operating voltage	3.1	5.0	5.25	V	
Peak current	50		75	mA	Peak value
Input Ripple			50	mV	Peak value
Input Noise			100	mV	Peak value
ESD			±200/±2K	V	(1)
ESD			±4K/±8K	V	(2)

Remarks

(1) The minimum power supply for the A01C series is 5V, the typical value is 12V, and the maximum value is 13V.

(2) The static electricity specification of the assembly line, contact static electricity should not be higher than ±200V, and air static electricity should not be higher than ±2KV.

(3) The probe shell and output pin comply with the IEC61000-4-2 standard.

Sensor Selection Instruction

The A01 integrated waterproof module including 3 series according to different application scenarios, and the output format is also divided into many kinds. The user can choose the corresponding model according to the actual application needs.

Series	Application	Model No.	Features	Output interfaces	Remark
A01A	Flat object	DYP-A01ANYUB-V2.0	Waterproof case + horn, The measuring range of the plane object is 28cm～750cm, Ranging angle≈ 40°	UART Auto	
		DYP-A01ANYTB-V2.0		UART Controlled	
		DYP-A01ANYWB-V2.0		PWM Auto	
		DYP-A01ANYMB-V2.0		PWM Controlled	
		DYP-A01ANYGDB-V2.0		Switch	
		DYP-A01ANY4B-V2.1		RS485	
A01B	Human body	DYP-A01BNYUW-V2.0	Waterproof case, The measuring range of plane object is 28cm～450cm. Stable measurement of the upper body of the human body within 200cm. The ranging angle is ≈75.	UART Auto	
		DYP-A01BNYTW-V2.0		UART Controlled	
		DYP-A01BNYWW-V2.0		PWM Auto	
		DYP-A01BNYMW-V2.0		PWM Controlled	
		DYP-A01BNYGDW-V2.0		Switch	
		DYP-A01BNY4W-V2.1		RS485	
		DYP-A01BNYUB-V2.0	Waterproof case with horn. The measuring range of the plane object is 28cm～750cm; Stable measurement of the upper body of the human body within 350cm.	UART Auto	
		DYP-A01BNYTB-V2.0		UART Controlled	
		DYP-A01BNYWB-V2.0		PWM Auto	
		DYP-A01BNYMB-V2.0		PWM Controlled	
		DYP-A01BNYGDB-V2.0		Switch	

A01B		DYP-A01BNY4B-V2.1	Range measurement angle ≈65.	RS485	
A010C	waste level	DYP-A01CNYUB-V2.1	Waterproof case with horn. The measuring range of flat objects is 28cm～250cm.	UART Auto	
		DYP-A01CNYTB-V2.1		UART Controlled	
		DYP-A01CNY4B-V2.1		RS485	

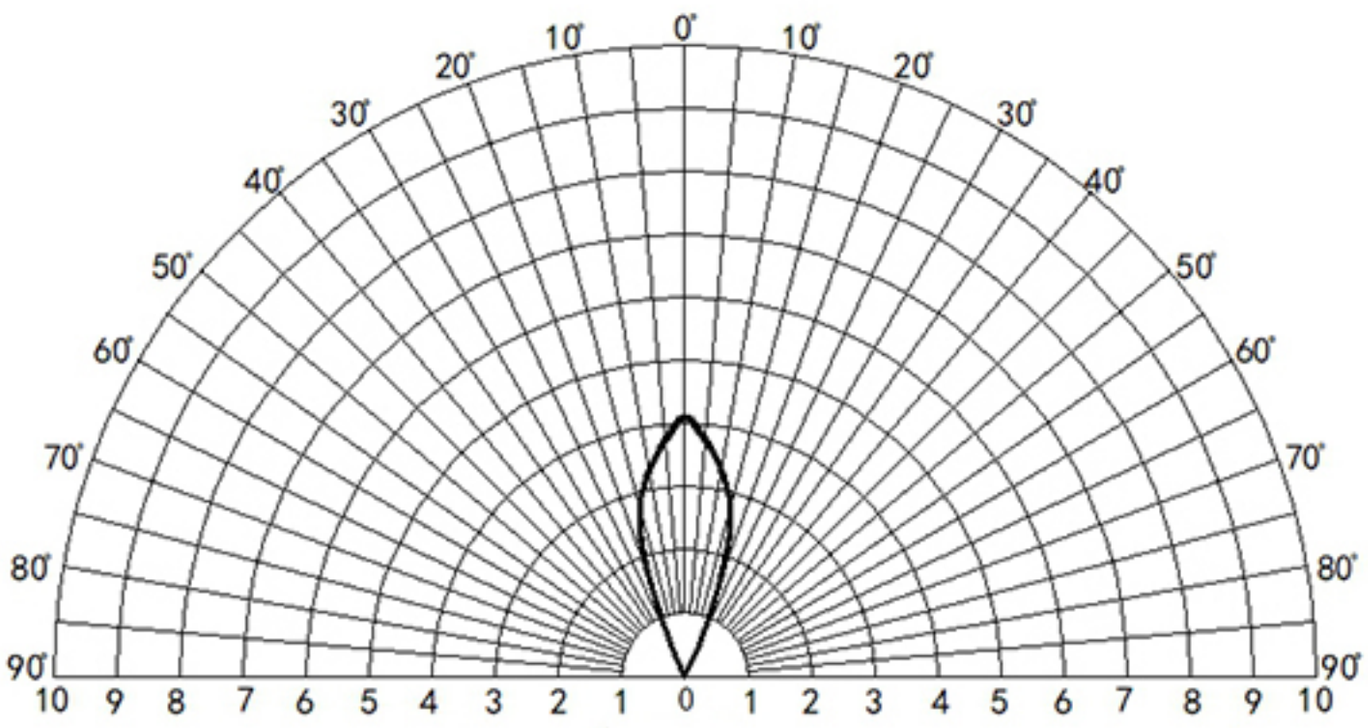
Note: Flat object range: at room temperature, data obtained from the detection of a corrugated box with a length * width of 60 cm * 50 cm.

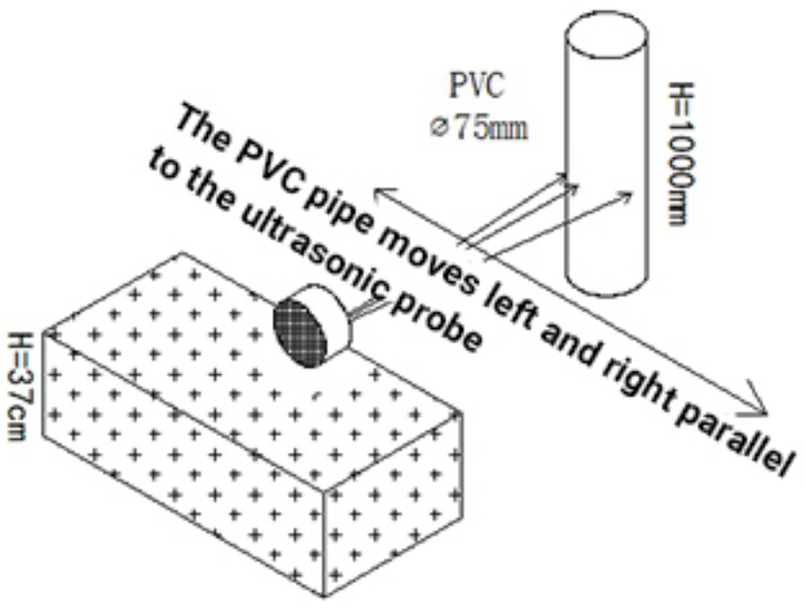
Ranging angle: at room temperature, the reference data obtained from the test of φ7.5cm*100cm white PVC pipe at a distance of 100cm from the module.

Beam Pattern

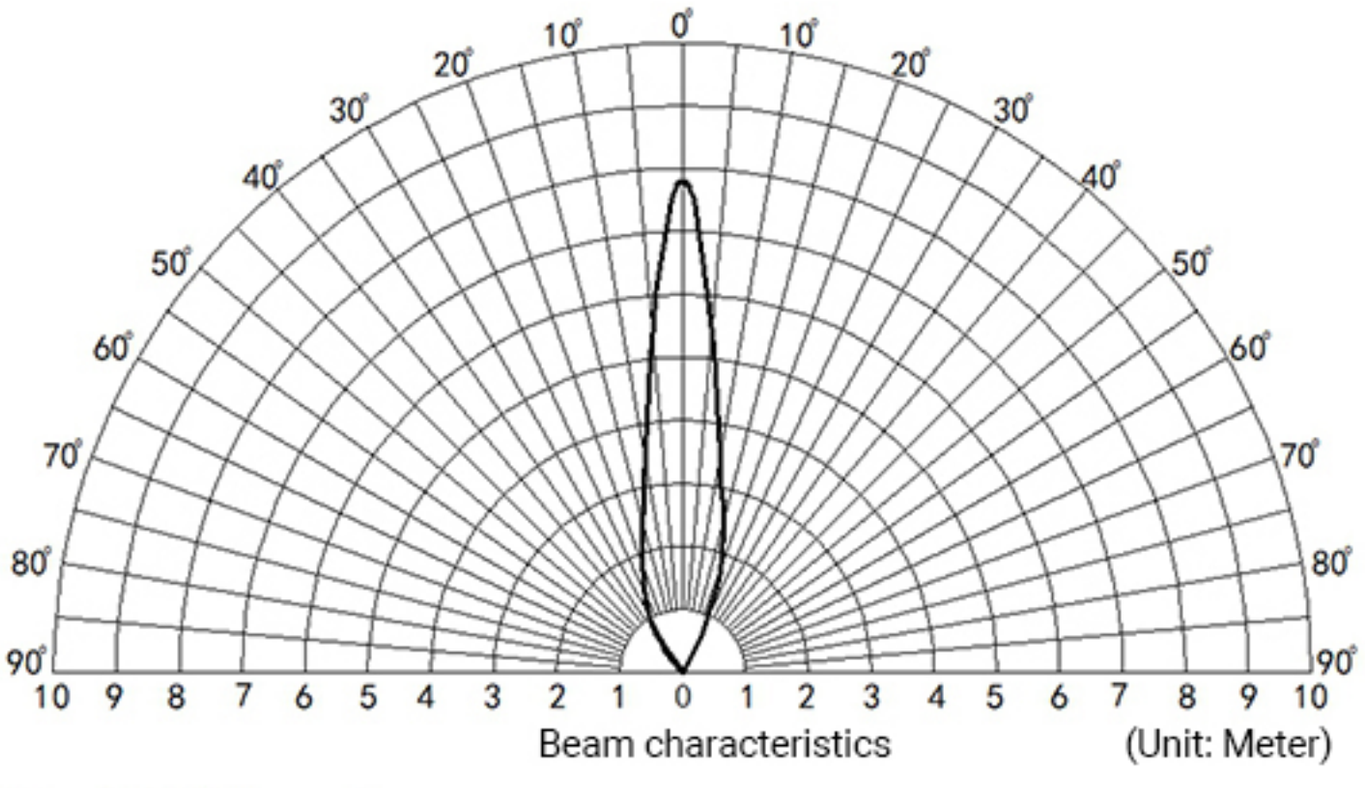
1. A01A series

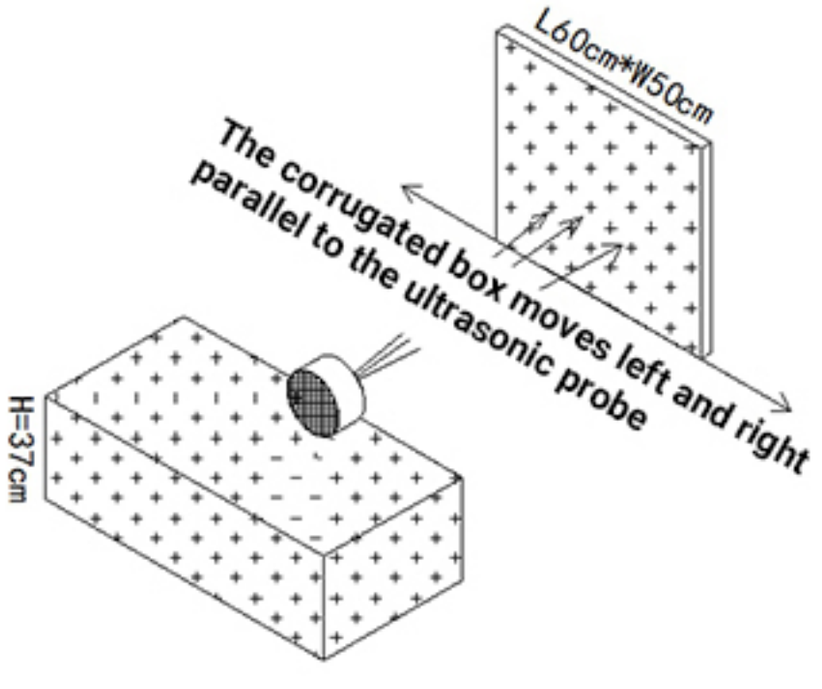
(1) The tested object is a white cylindrical tube made of PVC material, with a height of 100cm and a diameter of 7.5cm.





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

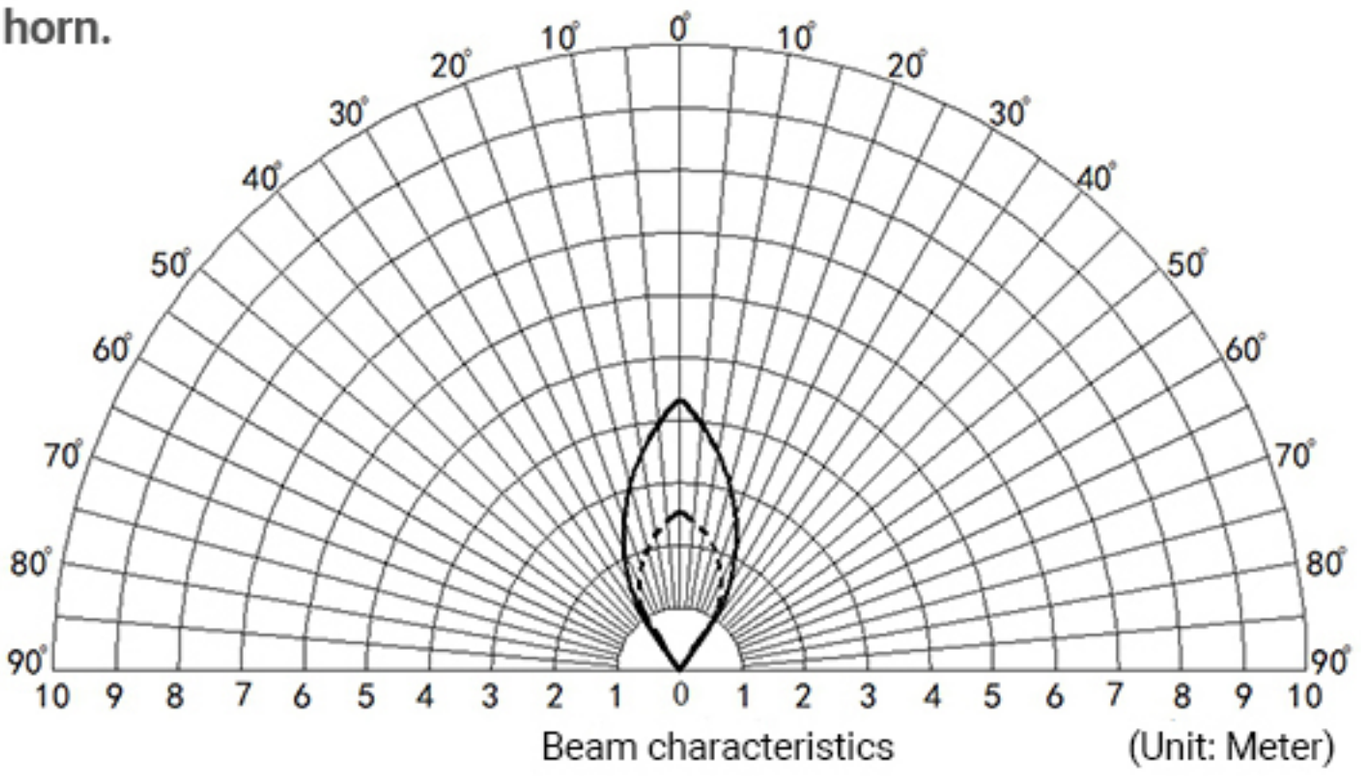


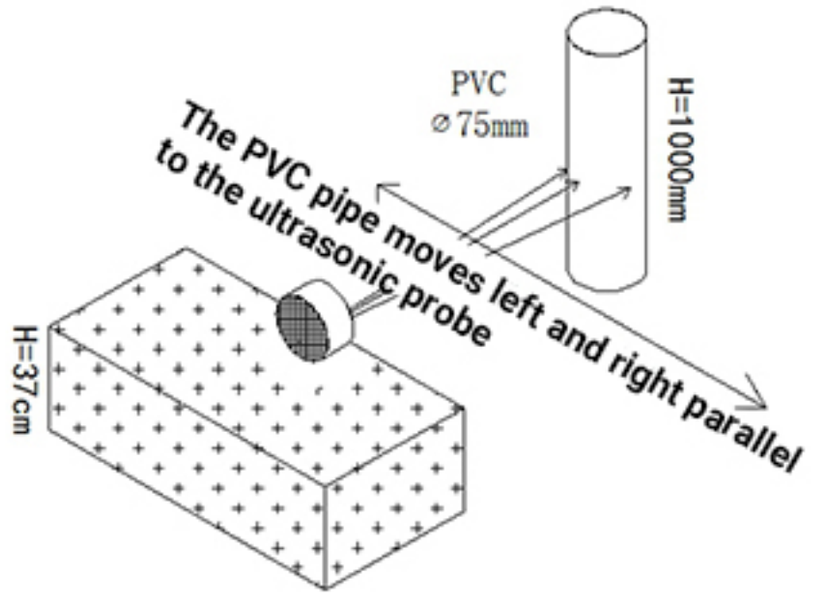


2. A01B series

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

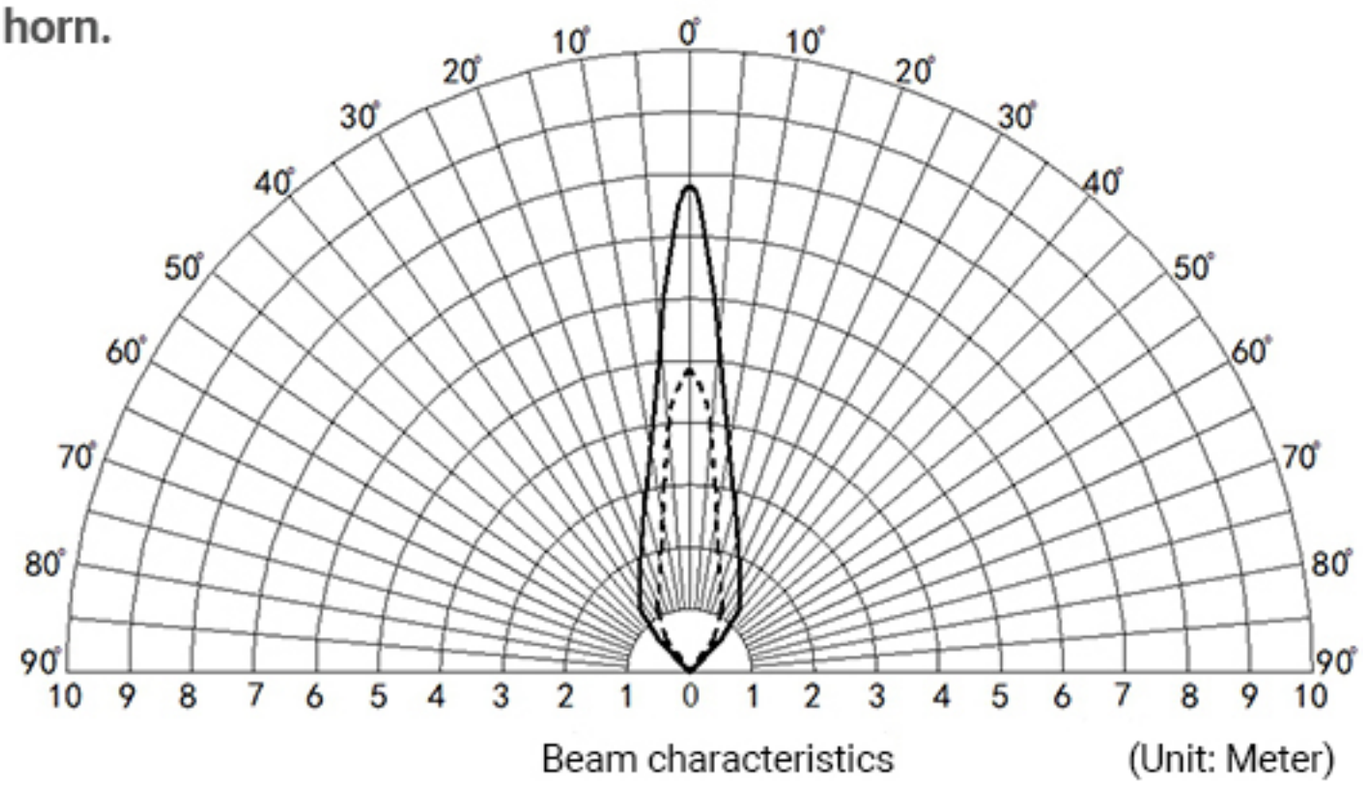
The solid line in the figure below is for sensor testing data with horn, the dashed line for sensor without horn.

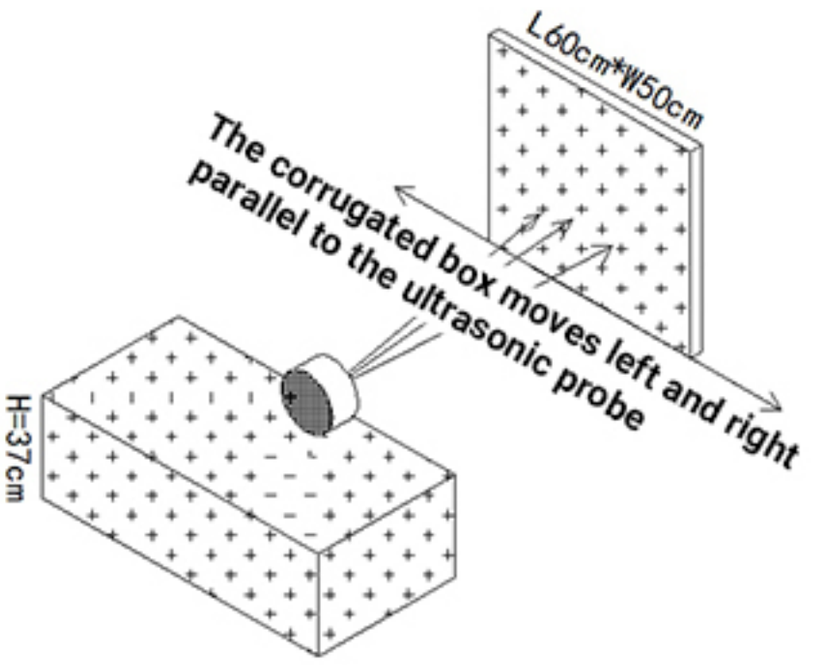




(2) The tested object is a corrugated box perpendicular to the 0° central axis, with a length * width of 60cm*50cm.

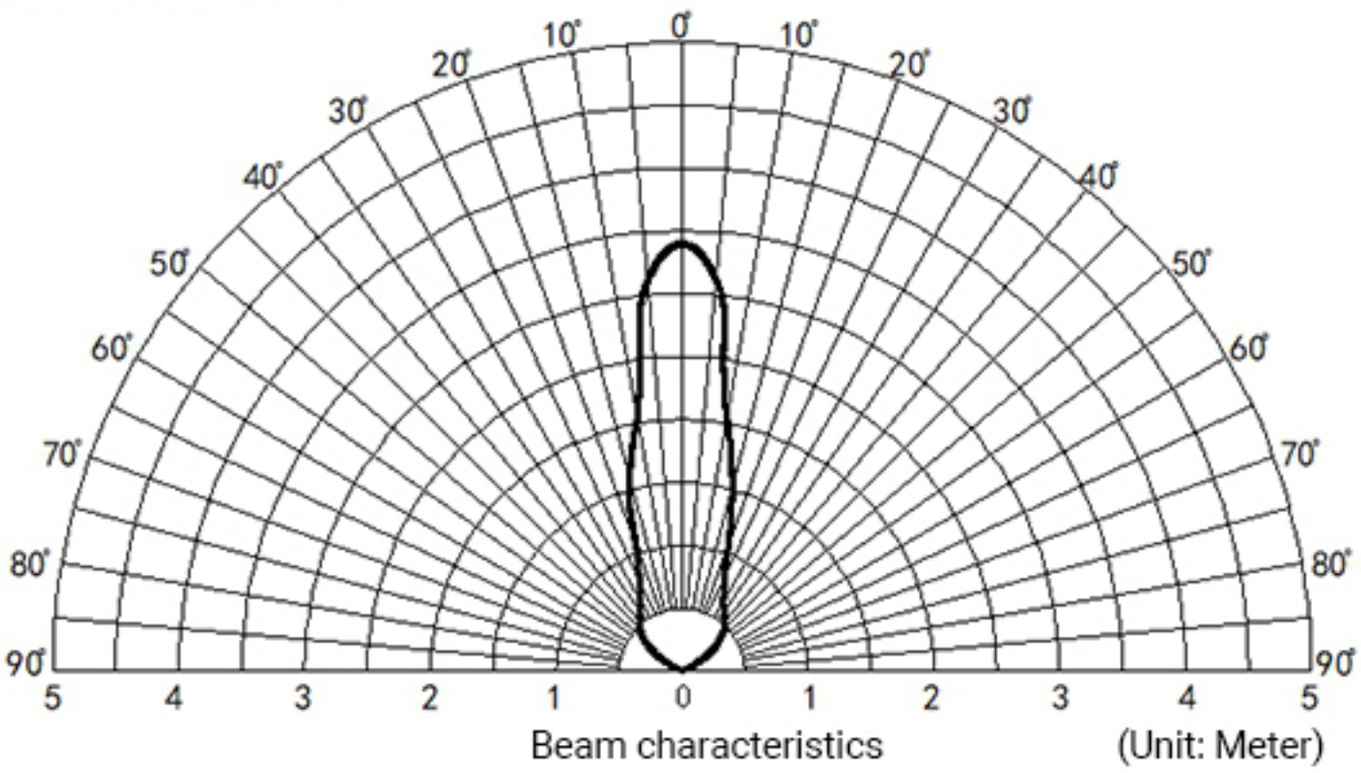
The solid line in the figure below is for sensor testing data with horn, the dashed line for sensor without horn.

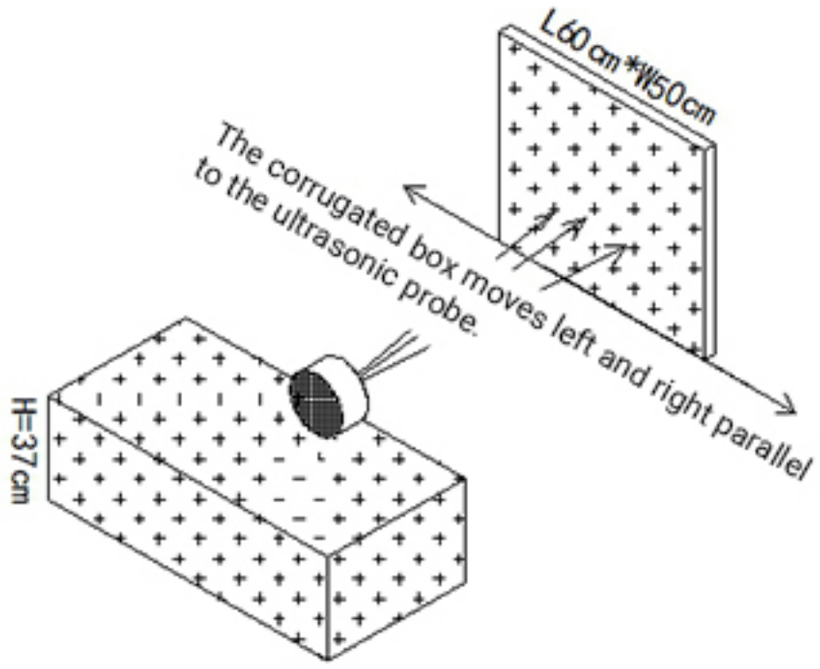




3. A01C series

(1) The tested object is a corrugated box perpendicular to the 0° central axis, with a length * width of 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℃, 85%RH, Power ON@5V, 72hrs	3	
2	low temperature	-20℃, Power ON@5V,72hrs	3	
3	High temperature and humidity storage	80℃, 80%RH, storage, 72hrs	3	
4	Low temperature storage	-30℃, storage, 72hrs	3	
5	Vibration test	10-200Hz,15min,2.0G, XYZ three axes, each axis is 0.5 hours	3	
6	Drop test	120cm 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 ≤10%.

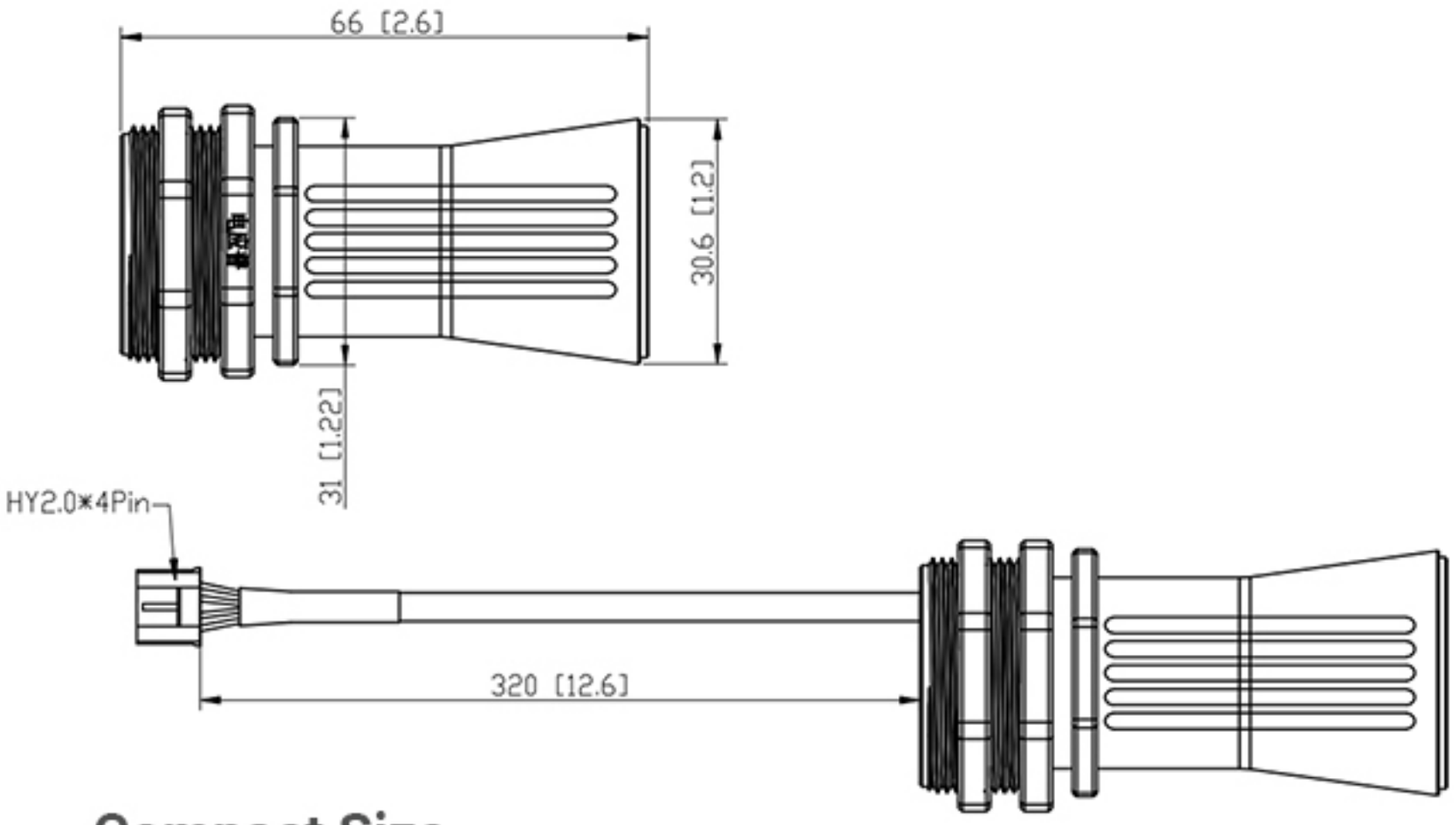
Notice

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.

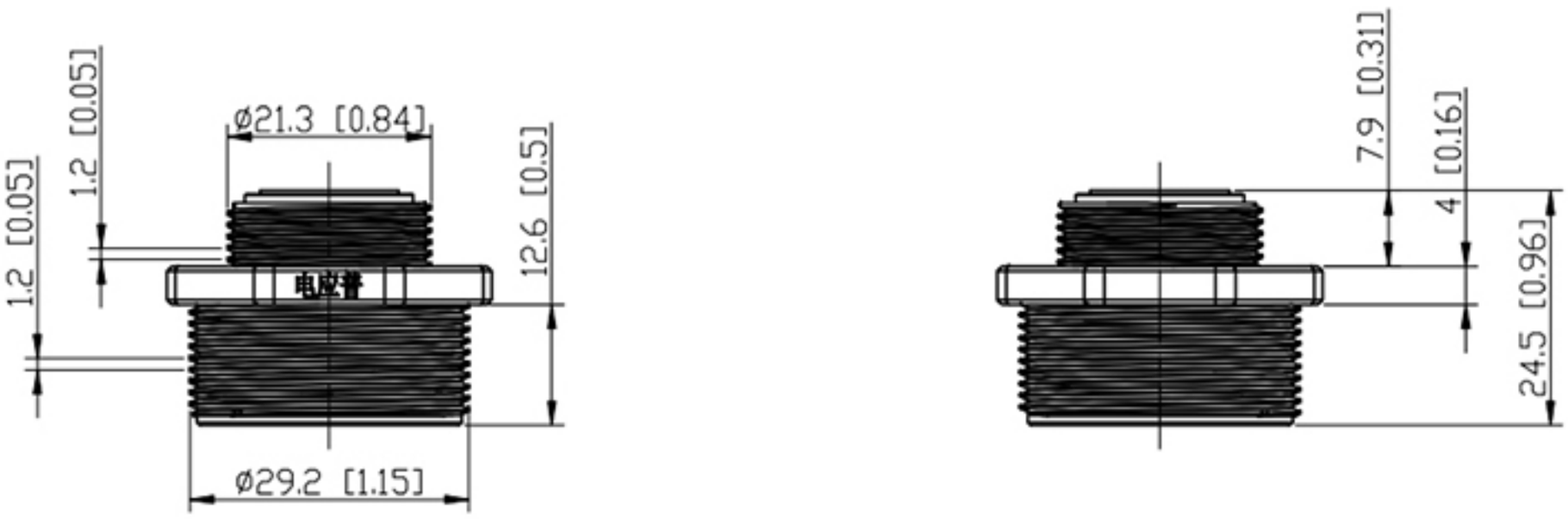
Mechanics

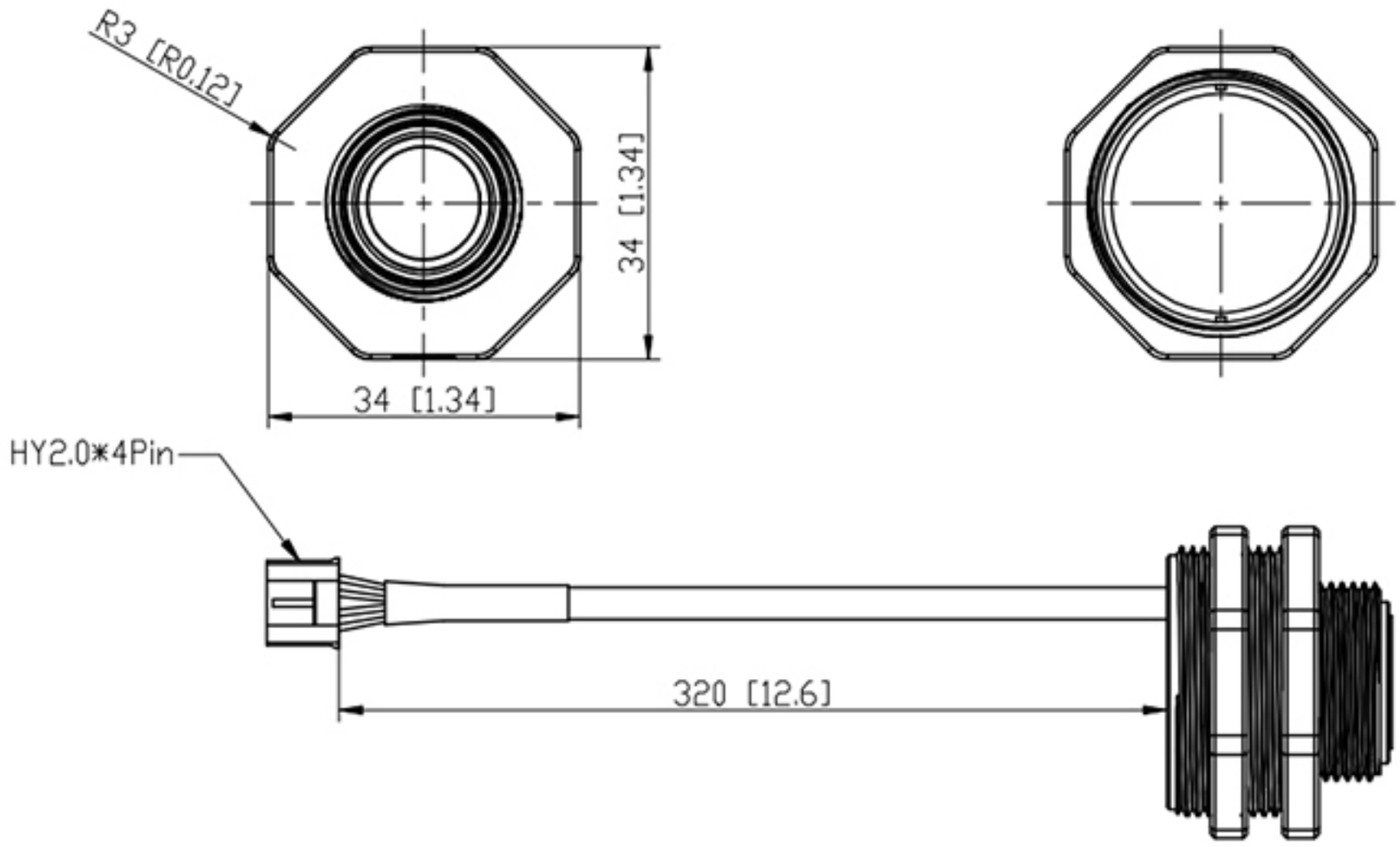
1. Mechanical Dimensions (mm-inch)

Full size(With Horn)

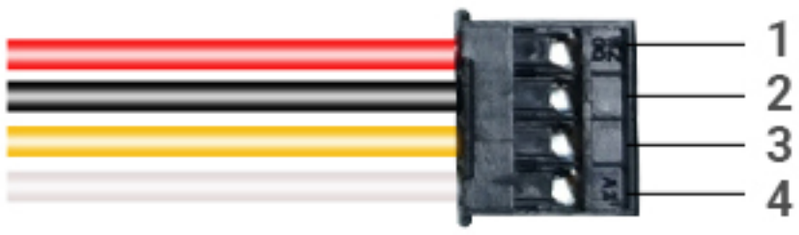


Compact Size





2. Pin out



Pin No.	Mark	Description	Remark
①	VCC	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

Remarks: The pin function corresponds to the output mode selected before ordering, and cannot coexist with the functions of other output modes