



DATASHEET

A22 Series Sensor Module

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1. Production introduction

1.1. General

The A22 module is an ultrasonic obstacle avoidance sensor designed based on robot automatic control application, focus on designing for problems on the current market ultrasonic sensor module large blind spot, large measurement angle, long response time, poor installation adaptability and other problems .

The A22 module has a series of advantages like small blind spot, small measurement angle, short response time, filtering co-frequency interference, high installation adaptability, dust and waterproof, long life and high reliability.

The intelligent acoustic processing technology independently developed by our company can identify and filter the interference acoustic wave, and output data more stable and reliable, making the A22 module reduce the probability of co-frequency ultrasonic interference to a certain degree, and meet the users' application needs for the complex environment in the field of robot automatic control.

A22 module, hereinafter referred to as "module".

1.2. Functionality abstracts

- Wide voltage power supply, working voltage: 3.3~12V (Maximum support 24V);
- 2cm standard blind area (product blind area can up to 1.5cm minimum);
- The farthest range can be set, a total 4-level range of 50cm、150cm、250cm and 350cm can be set through instructions;
- A variety of output modes are available, UART auto / controlled, PWM controlled, switch volume TTL level, RS485, IIC, etc. Although the output mode is different, the function is exactly the same;
- The default baud rate is 115,200, Supports modification to 4800, 9600, 14400, 19200, 38400, 57600, 76800;
- Ms-level response time, data output time can up to 13ms fastest
- Single angle measurement range is wider; single angle can support 4-level settings of 30°、40°、50°、60° to apply to different application scenarios;
- Built-in noise reduction function which can support 5-grade noise reduction level setting, suitable for battery power supply, short and long distance USB power supply, switch power supply and large noise power supply;
- Intelligent acoustic wave processing technology, built-in intelligent algorithm to filters interference sound waves; When the co-frequency interference is present in the detection environment, the "FFFE" data is output to make a prompt, which can identify the interference sound waves and automatically perform filtering, the correct rate is increased by 80% in the co-frequency interference environment;
- Waterproof structure, waterproof grade IP67
- Ultra-wide temperature design, Working temperature -25°C to +65°C
- Electrostatic protection design, input and output interface with electrostatic protection devices, in line with IEC61000-4-2 standard.

1.3.Product advantages

- Wide supply voltage
- Small blind spot
- Output method is optional
- Support range modification
- Support baud rate modification
- Support address modification
- Support angle setting
- Support the power supply noise reduction level setting
- Effectively reduce the probability of same frequency interference
- High waterproof grade
- Small size, simple to install
- Wide working temperature
- Strong anti-static
- High measurement accuracy
- Data measurement is stable and reliable

1.4.Scope of application

- Robot avoidance and automatic control
- Horizontal ranging
- Parking Management System
- Object proximity and presence awareness

1.5.Scope of application

Parameters	UART auto	UART controlled	PWM pulse width	Switch volume	RS485	IIC	Unit	Remarks
Working voltage	3.3~12	3.3~12	3.3~12	3.3~12	3.3~12	3.3~12	V	DC
Standby current	-	≤5	≤5	-	-	-	uA	(1)
Average working current	≤9	≤9	≤9	≤9	≤10	≤10	mA	(2)

Blind area distance	≤ 2	≤ 2	≤ 2	≤ 2	≤ 2	≤ 2	cm	
Flat object range	2~300	2~300	2~300	2~300	2~300	2~300	cm	(3)
Output response time	8~140	8~140	<15	300~1500	15~750	8~140	ms	(4)
Power working hours	≤ 1000	≤ 1000	≤ 1000	≤ 1000	≤ 1000	≤ 1000	ms	
Working period	100~180	Controlled	Controlled	100~180	Controlled	Controlled	ms	
Working period	100~180	Controlled	Controlled	100~180	Controlled	Controlled	ms	
Output method	Auto	Controlled	Controlled	Auto	Controlled	Controlled	-	
Measurement accuracy at room temperature	$1+(S*0.3\%)$	$1+(S*0.3\%)$	$1+(S*0.3\%)$	$1+(S*0.3\%)$	$1+(S*0.3\%)$	$1+(S*0.3\%)$	cm	(3)
Temperature compensation	Compensate	Compensate	Compensate	Compensate	Compensate	Compensate	-	
Single angle	30~60	30~60	30~60	30~60	30~60	30~60	°	(5)

Remarks : (1)The module exceeds 5S does not receive the control instruction will enter a low power consumption dormant state, when the power consumption current is the standby power consumption current;

(2)Typical data obtained by testing with temperature 25°C, humidity 65% RH, power supply 12V, and 100ms working cycle;

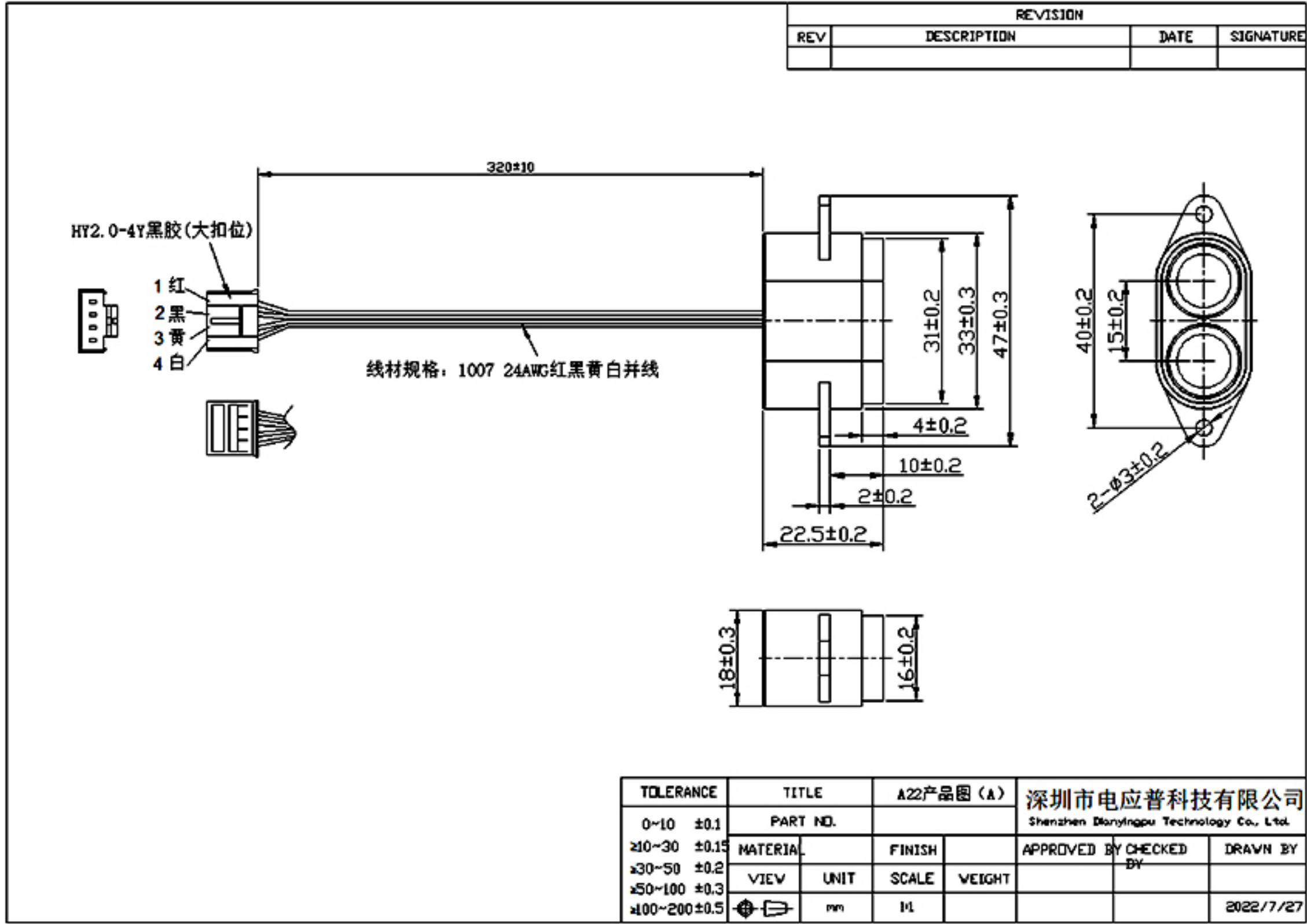
(3)The temperature is 25°C, the humidity is 65% RH, the measured object is a 50cm×60cm flat carton, and the transducer should be as vertical as possible. S represents the measurement distance;

(4)The output response time is 0.5~3m range test, the shorter the range, the faster the response time.

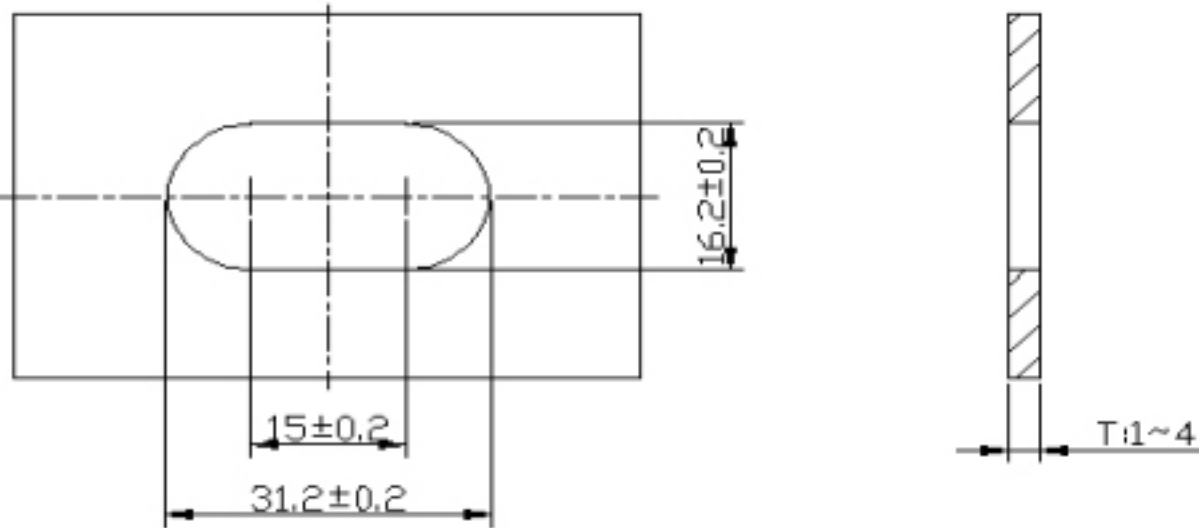
(5)Test data for single-angle modules,The measured object is the reference data obtained from the test of φ 75mm×100cm white PVC pipe with a distance of 100cm.

1.6.Mechanical characteristics

Product structure size:

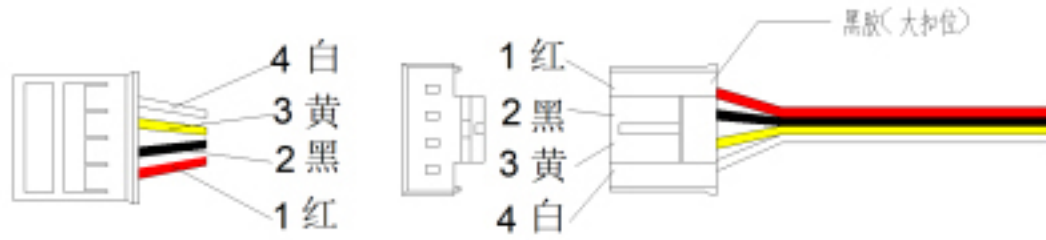


Recommendations of installing the opening:



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1.7.Interface definition



PIN #	PIN name	PIN description	Remarks
1	VCC	Power input PIN	(1)
2	GND	Ground	(1)
3	RX/B	Function PIN	(1)
4	TX/A	Function PIN	(1)

Remarks: (1) Lead wire, pin function and output mode of product model correspond one-to-one, and cannot coexist with other output modes.

2.Production introduction

2.1.Rated environment conditions

Item	Minimum value	Typical value	Maximum	Unit	Remark
Storage temperature	-30	25	80	℃	
Storage Humidity		65%	90%	RH	(1)
Operating temperature	-25	25	65	℃	
Operating Humidity		65%	80%	RH	(1)

Remark:

- (1) a. When the ambient temperature is 0-39℃, the maximum humidity is 90% (non-condensing)
 b. When the ambient temperature is 40-50℃, the highest humidity is the highest humidity in nature at the current temperature (no condensation)

2.2.Rated electrical conditions

Parameter	Specification			Unit	Remarks
	Minimum	Typical value	Maximum		
Operating voltage	3.3	5	12	V	
Peak current			150	mA	(1)
Input ripple			50	mV	Peak to peak
Input noise			100	mV	Peak to peak
ESD			±4K/±8K	V	

Remarks: (1) The connecting leads and pins conform to the IEC61000-4-2 standard

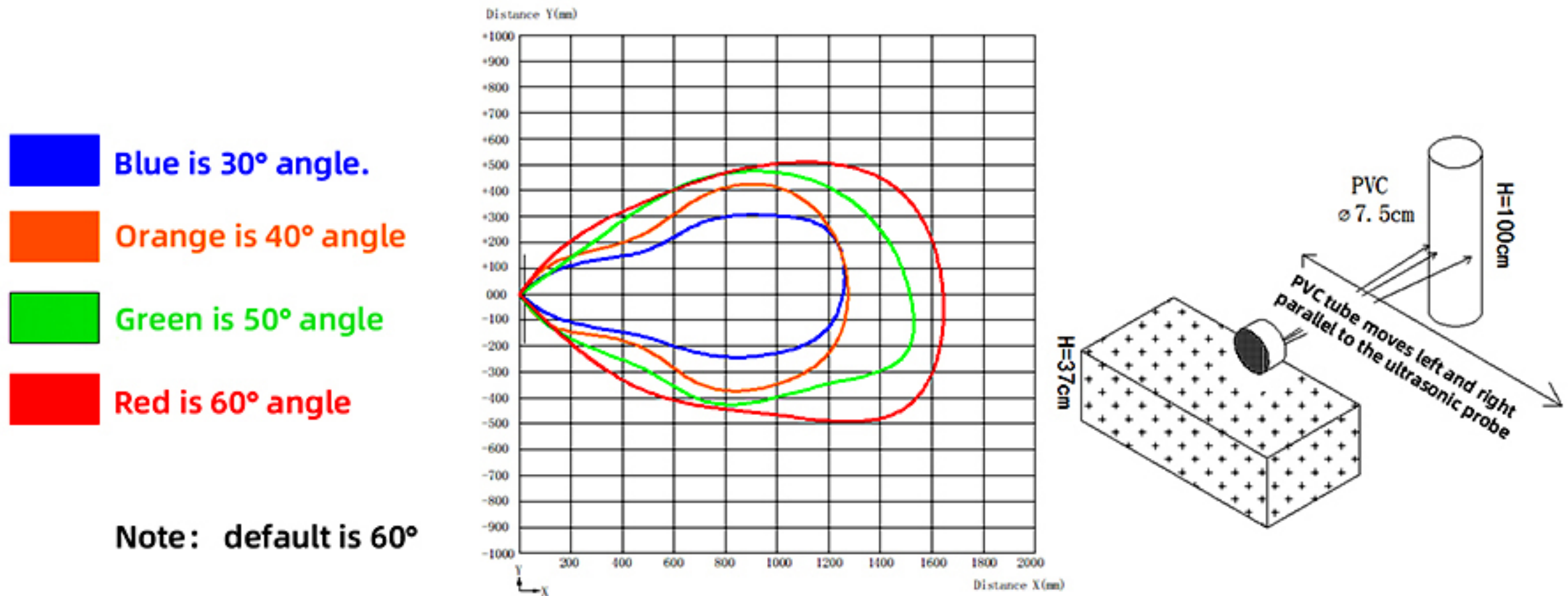
3.Model selection description

The output format of this series of ranging modules is divided into six formats. If there are special requirements that need to modify the response time, angle, communication agreement, etc., you need to communicate with our FAE engineers during purchasing.

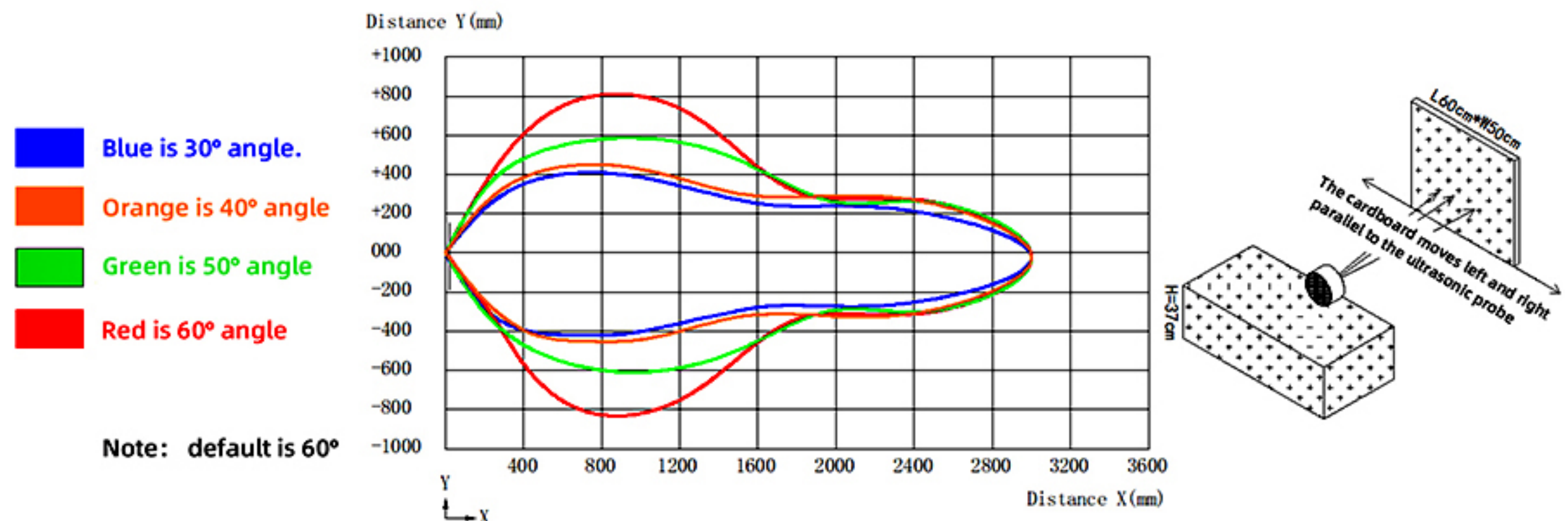
Serial	A22series model	Feature	Output method	Remarks
1	DYP-A22YYUW-V1.0	Single angle	UART auto	
2	DYP-A22YYTW-V1.0	Single angle	UART controlled	
3	DYP-A22YYMW-V1.0	Single angle	PWM pulse width	
4	DYP-A22YYGDW-V1.0	Single angle	Switch output	
5	DYP-A22YYCW-V1.0	Single angle	IIC	
6	DYP-A22YY4W-V1.0	Single angle	RS485	

4. Reference diagram of the effective detection range

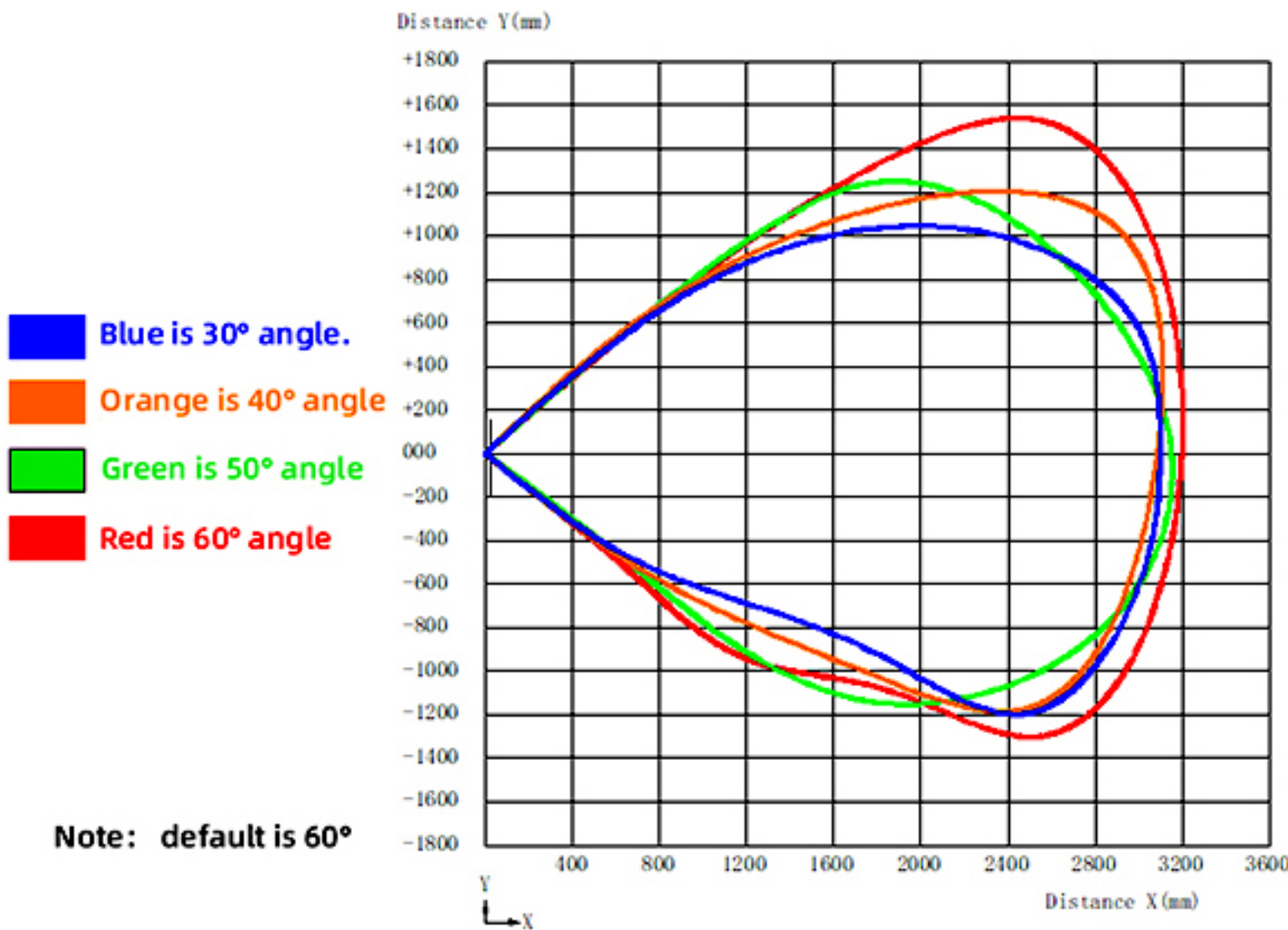
(1) The tested object is PVC material of white cylindrical tube, height of 100cm and diameter of 7.5cm.



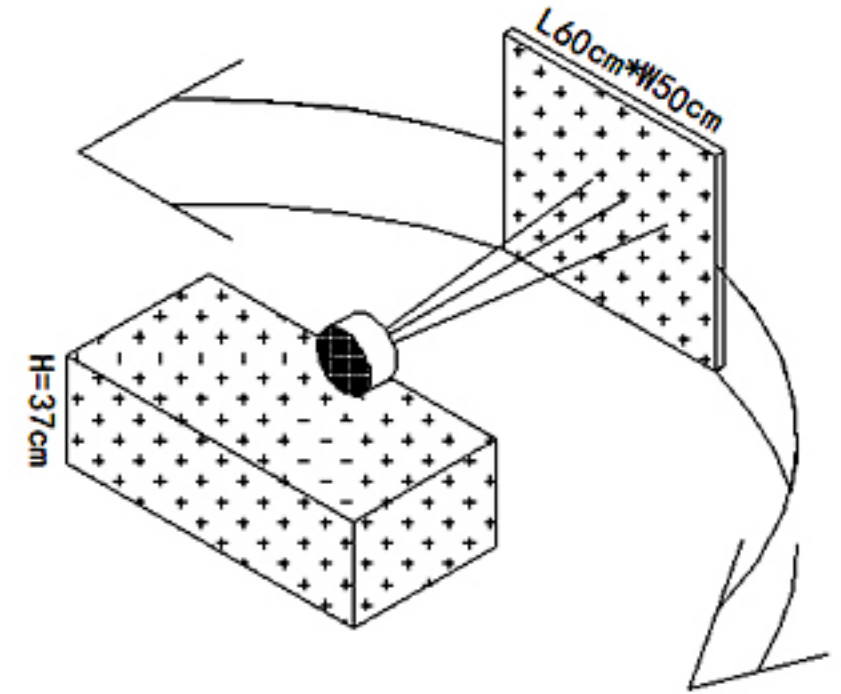
(2) The tested object is "corrugated box", perpendicular to the 0° central axis, and the L * W is 60cm*50cm.



(3) The tested object is "corrugated box", Tangent to arc, the L * W is 60cm*50cm.

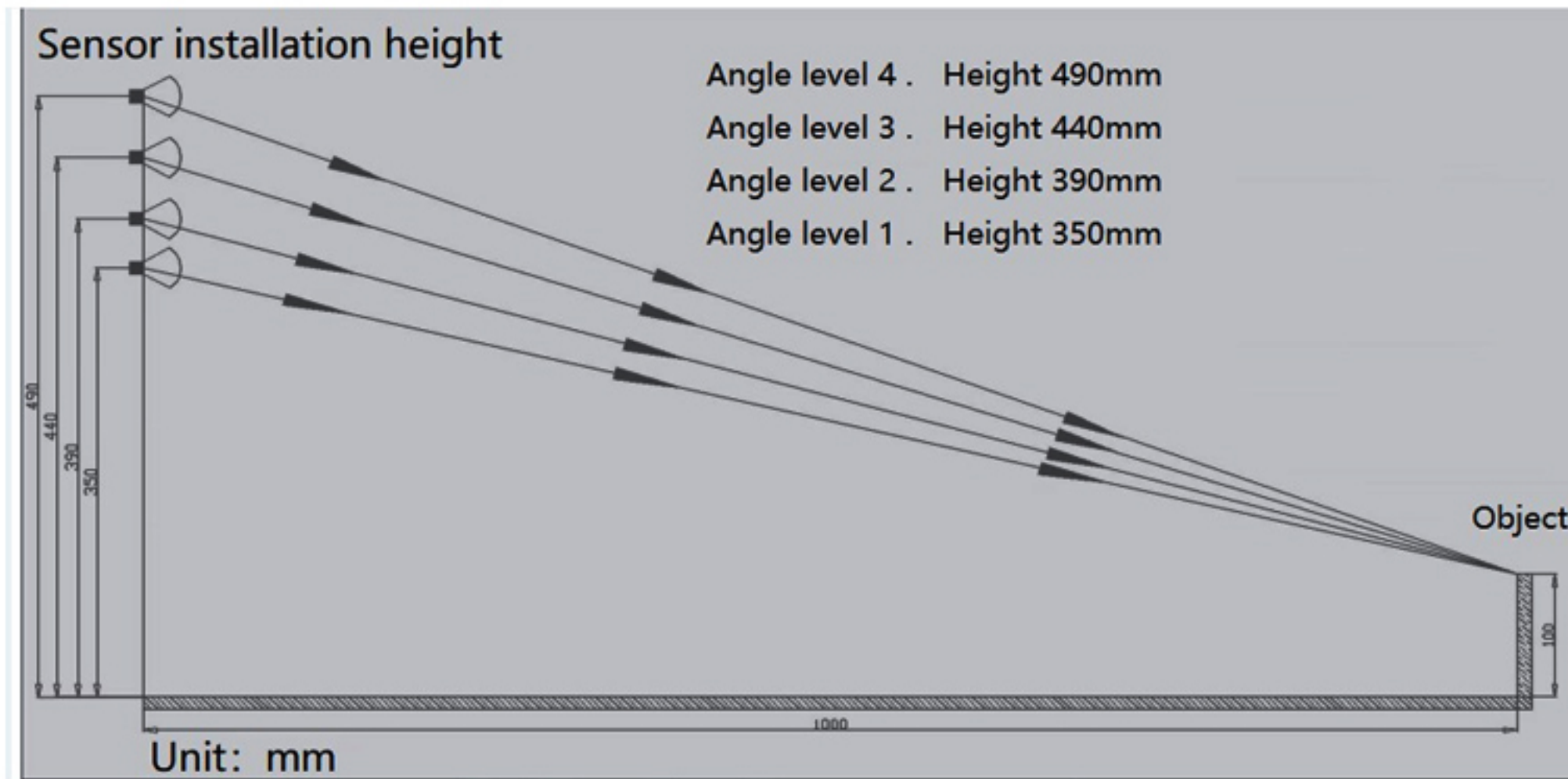


The cardboard moves in a circular arc with the ultrasonic probe as the center



5. Installation Suggestions

1. When installing the sensor, ensure that the transmitting surface of the transducer is parallel to the measured plane, so as to ensure that the sound waves emitted vertically to the surface of the measured object return with maximum energy to ensure maximum range stability and reliability;
2. In front of the sensor, it should be noted that except for the measured object, other objects should avoid the sensor testing range;
3. There is steam at the site of use and installation, and water droplets are easy to adhere to the surface of the probe, so try to avoid the influence of water droplets;
4. The installation and fixation of the sensor needs to avoid structural deformation, metal or other resonance, and avoid resistance components such as (elbows, valves, variable diameters);
5. The installation height of the ground or obstacle objects and the module is recommended. The actual module installation height can refer to the above effective detection range reference diagram, and select the appropriate installation height according to the range of different angle requirements; (The following is the different angle levels for ground obstacles and module installation height reference picture)



6. Matters needing attention

1. The company reserves the right to change this document and update the functions without notice;
2. Please pay attention to the structural tolerances when designing. Unreasonable structural design may cause transient abnormalities in module functions;
3. Please pay attention to the evaluation of electromagnetic compatibility when designing. Unreasonable system design may cause abnormal module function;
4. When the boundary application of the product limit parameter is involved, you can contact our FAE to confirm the relevant precautions.
5. The response time and same-frequency interference of this product are configured in common scenarios, and can be improved in special scenarios. You can contact our FAE to communicate with related matters.

7. Packaging specification

1. The default is DYP's conventional packaging method;
2. Packaging materials can be customized according to customer IQC related standards;
3. The container transportation method needs to adopt the staggered consolidation method, and at the same time, the outer edge of the single stack needs to be wrapped with a reinforced gusset to provide sufficient support.