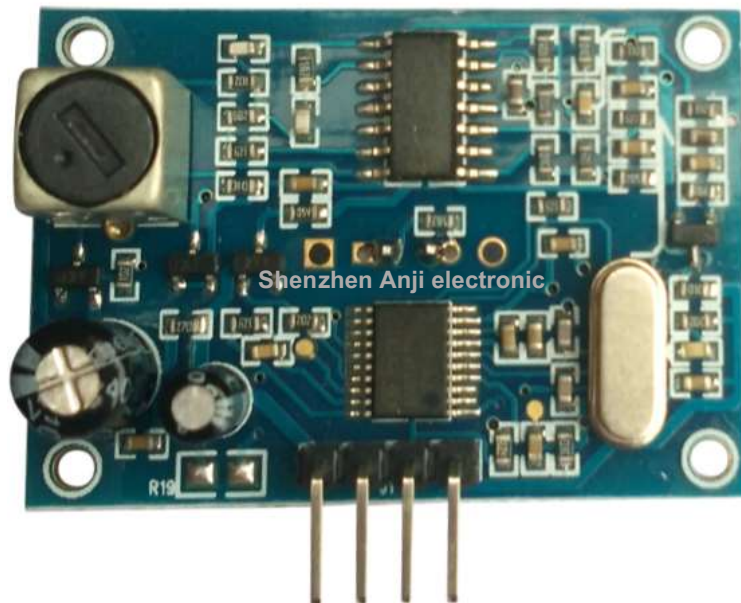


Ultrasonic Ranging module integrated
serial multiplexer Manual

model: AJ-SRO4M-RD

Product physical map:



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>> product description

AJ-SR04M- Ultrasonic Ranging TX module transceiver is the use of a waterproof strip line probe, using

Non-contact ultrasonic detection technology designed test. Products in the range of 20cm to 800cm, it is possible to accurately detect the distance to the object plane, and within the range of 20cm to 250cm, people can be accurately measured.

The basic working principle: This module Ultrasonic Ranging 3-5.5V power connection, while up to 255 modules working in parallel. If the relevant requirements, you can contact the company, we will provide you with customized and meet your demand for the product

Divergence angle can be freely adjusted, the baud rate is set free

>> Features

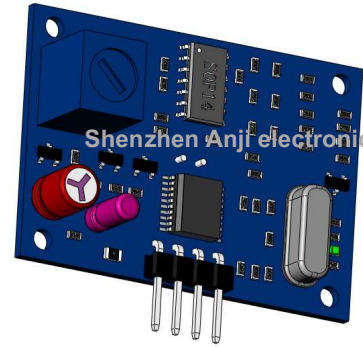
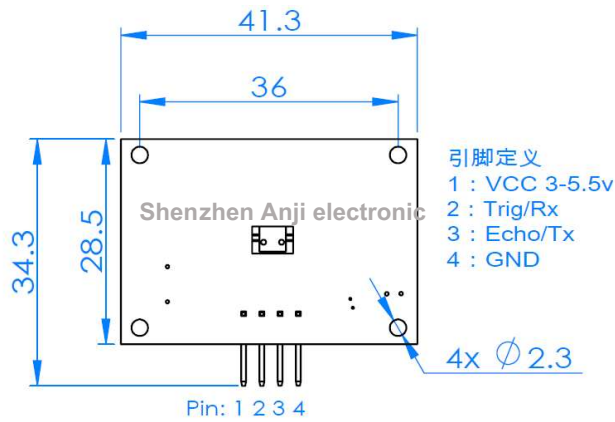
- 1, small size, easy to use;
- 2, low-power, low-power mode when the first Optional <20ua; 3, using the wide voltage operating voltage 3-5.5V 3, high measurement accuracy 1mm maximum resolution accuracy; 4, anti-interference;
- 5, integrated with a line probe enclosed water in the wet, poor measurement field

>> Product Applications

- 1, the smart car distance, obstacle avoidance 2, the object distance measurement, height measurement
- body 3, intelligent traffic control, parking control 4, teaching and research, security, industrial control 5, artificial intelligence, the aircraft altitude measurement

>> Technical Parameters:

Product Structure

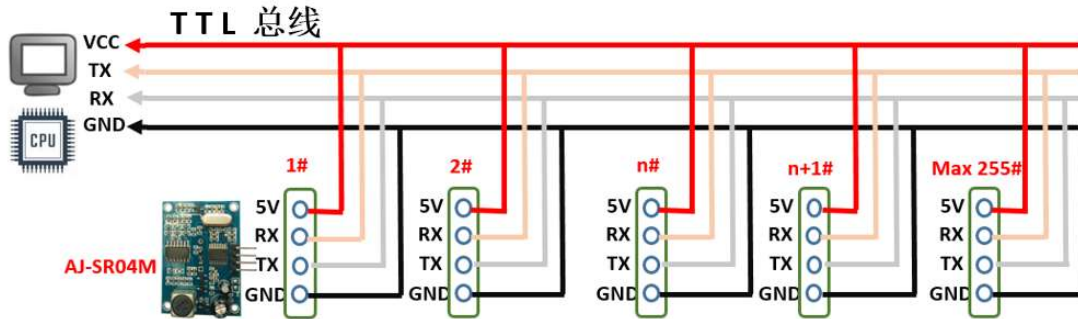


Electrical parameters

Electrical parameters	AJ-SR04M Ultrasonic module
Operating Voltage	DC 3-5.5V
Working current	40mA Duration is less than 50us
stand-by current	2mA
working frequency	40KHz
The farthest range	8m
Recent Range	20cm
Angle measurement	75 degree
Input trigger signal 2: Trig / RX	Trigger / serial receive / enable switch
3: Echo / TX	Pulse Width / serial output / switch output
Output echo signal output	TTL, Serial ports 5 The serial output modes selected format
resolution	4800/9600/19200/38400/115200 n 8 1
	approximately 1mm
Operating temperature	--20-75 °C
storage temperature	--40-80 °C
Probe line length	1 Meter / 2.5 Meter / 6 Meter
Status Indication	led It indicates the state, a work flash once / output state of the switch
Standard sizes	41.3 * 28.5 * 23mm

>> Hardware connections Description

Computer or MCU End of TX And all modules RX Tied together, or computer MCU End of RX And all modules TX Tied together, most parallel 255 Stations, bus coupling is noted TTL Level, not 232 Level.



>> Exemplary communication protocol and

All communication format is as follows:

Starting	station number	function number	data direction	data 0	Data 1	Data 2	Data 3	End code	BCC	
0X7F	00	0X10	00	00	00	00	00	00	0X03	

Start: Start code is 0X7F

Station No: Data transmission station to which data or which station back

Function Code: 0X10 Read module parameters, 0X11 Write module parameters, 0X12 Distance acquisition module, 0X20 Sleep all directions module

data: 0X00 Computer or MCU Sending data to the module, 0X01 Module to the computer or MCU Response data 0,1,2,3: Valid data bits, with the command varies according to the end of the code:

fixed 0X03

BCC: And verification, from " Station No " I.e., the second end code added 0X03 for BCC Value does not include start bit 0X7F

Note: It is recommended every command down minimum interval of 50ms;

Communication Example 1: Number reading station # 1 # 2 # 3 Station information

	Starting	Station No	command	Data direction	data0	data1	data2	data3	End code	And check
7F data read station # 1		01	12	00	00	00	00	00	03	16
7F data read station # 2		02	12	00	00	00	00	00	03	17
7F data read station # 3		03	12	00	00	00	00	00	03	18

Start: Start code is 0X7F

Station No: Which transmits data to the station

Function Code: 0X12 Direction data read from the module: 0X00 Computer or MCU

Sending data to the module

data0,1,2,3: Without any sense the end of

the code: fixed 0X03

BCC: And verification, from " Station No " I.e., the second end code added 0X03 for BCC Value does not include start bit 0X7F

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Communication Example 2: Station No # 1 # 2 # 3 Information from the station return

	Starting	Station No. Command	Data direction	data0	data1	data2	data3	End code	And check
Return 1 # 7F data		01	0x12 01	XX	XX	00	00	03	BCC
2 # 7F return data		02	0x12 01	XX	XX	00	00	03	BCC
3 # 7F return data		03	0x12 01	XX	XX	00	00	03	BCC

Start: Start code is 0X7F

Station No: Which transmits data to the station

Function Code: 0X12 Direction data read from the module: 0X01 Module to the computer or MCU Response data

data0,1: data0 * 0x100 + data1 = Distance, distance units mm data2,3: Without

any sense the end of the code:

fixed 0X03

BCC: And verification, from " Station No " I.e., the second end code added 0X03 for BCC Value does not include start bit 0X7F

Communication Example 3: Reading module station above parameters

	Starting	Station No. Command	Data direction	data0	data1	data2	data3	End code	And check
Return 1 # 7F data		00	0X10 00	00	00	00	00	03	BCC

Start: Start code is 0X7F

Station No: 00 All stations in response to greater than 0 In response to the corresponding station, if there are a plurality of modules on the bus do not use 00

Function Code: 0X10 Direction data read module parameters: 0X00 Computer or MCU

Sending data to the module

data0,1,2,3: Without any sense the end of

the code: fixed 0X03

BCC: And verification, from " Station No " I.e., the second end code added 0X03 for BCC Value does not include start bit 0X7F

Communication Example 4: Module returns parameter

	Starting	Station No. Command	Data direction	data0	data1	data2	data3	End code	And check
Return 1 # 7F data		04	0X10 01	04	1E	01	01	03	BCC

Start: Start code is 0X7F

Station No: 4 # Module returns parameter values

Function Code: 0X10 Direction data read module parameters: 0X01 Module to the computer or MCU Response data

data0: Module station number is set 4 # station

data1: Furthest distance 1E = 30 = 3.0 Meter, decimeter resolution

data2: Measuring angle = 75- (data2 * 5) = 70 Degrees measurement angle is approximately 70 degree

data3: Communication baud rate 00 = 240,001 = 960,002 = 1,920,003 = 3,840,004 = 115200

End code: fixed 0X03

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BCC: And verification, from " Station No " I.e., the second end code added 0X03 for BCC Value does not include start bit 0X7F

Communication Example 5: Write module parameters

	Starting	Station No. Command	Data direction	data0	data1	data2	data3	End code	And check
Return 1 # 7F data		00	0X11 00	04	1E	01	01	03	38

Start: Start code is 0X7F

Station No: 00 All stations in response to greater than 0 In response to the corresponding station, if there are a plurality of modules on the bus do not use 00

Function Code: 0X11 Write module parameter data direction: 0X00 Computer or MCU

Sending data to the module

data0: Module station number is set 4 # station

data1: Furthest distance 1E = 30 = 3.0 Meter, decimeter resolution

data2: Measuring angle = 75- (data2 * 5) = 70 Degrees measurement angle is approximately 70 degree

data3: Communication baud rate 00 = 240,001 = 960,002 = 1,920,003 = 3,840,004 = 115200

End code: fixed 0X03

BCC: And verification, from " Station No " I.e., the second end code added 0X03 for BCC Value does not include start bit 0X7F

>> Computer software debugging method

Software Interface Description:



1: The selected station number can be acquired from the software, if a failure to obtain the software will automatically shield the station number

2: Distance obtaining period, provided the minimum 30ms 3: Select automatic trigger " open " And

the normal configuration 10 # Location of the serial port parameters

4: Configuration or station number is read out of the module

5: Readout module configuration or the maximum distance

6: Configuration or angle readout module level

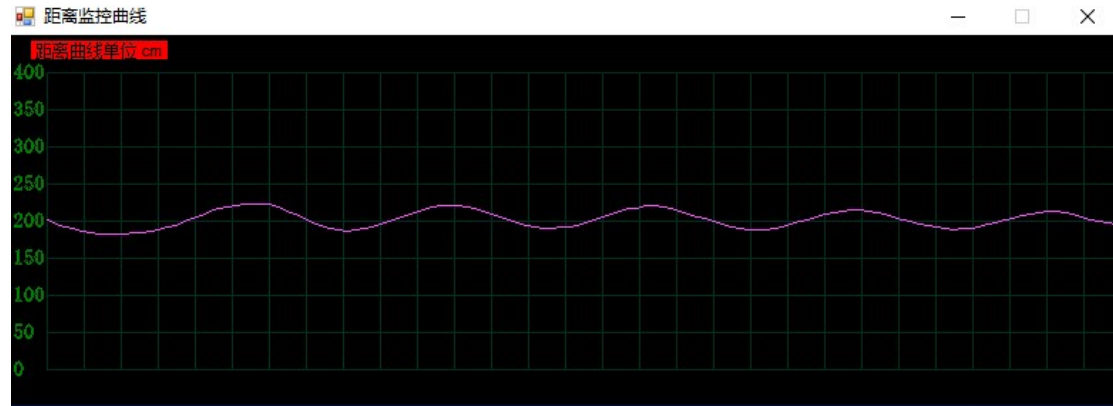
7: Or readout module configured baud rate

8: Readout module parameters before normal operation requires configuration 10 # Location of the serial port parameters

9: Write module parameters before normal operation requires configuration 10 # Location of the serial port parameters

Distance waveform diagram:

Click on the main interface " From the waveform of FIG. " Distance curve to open the interface, if a normal distance data acquisition to the table will be updated once, did not get the normal form will not be updated.



The new module-hand configuration methods:

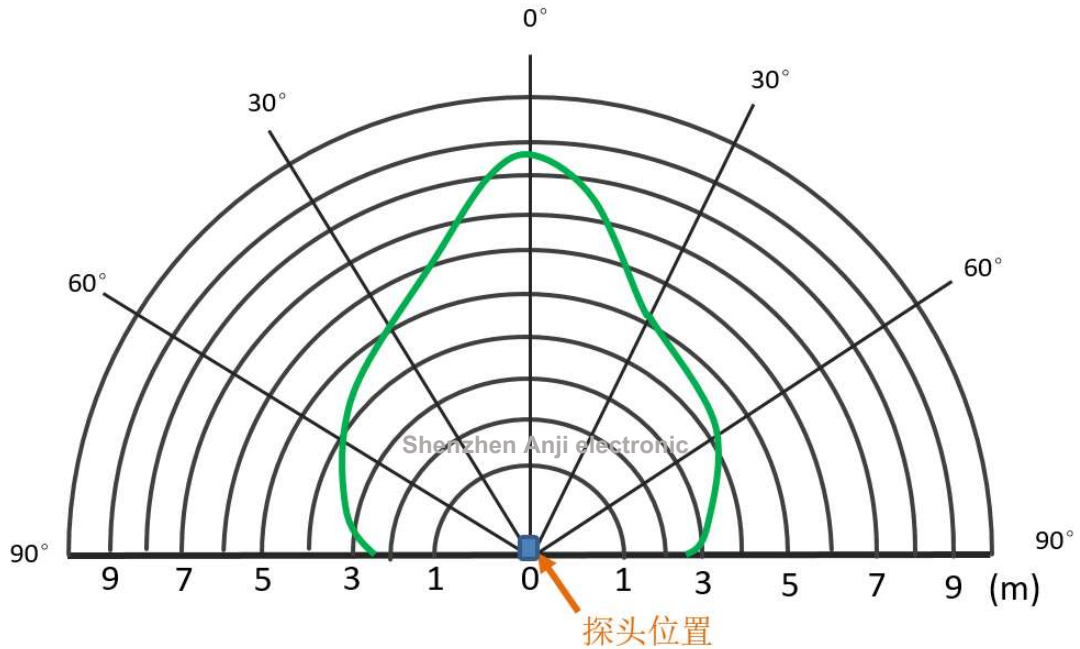


1: module factory default is 9600 baud

2: Write parameters to the module in which the module baud need to restart to take effect, other parameters with immediate effect

>> DESCRIPTION OF FIG

module mounting beam angle

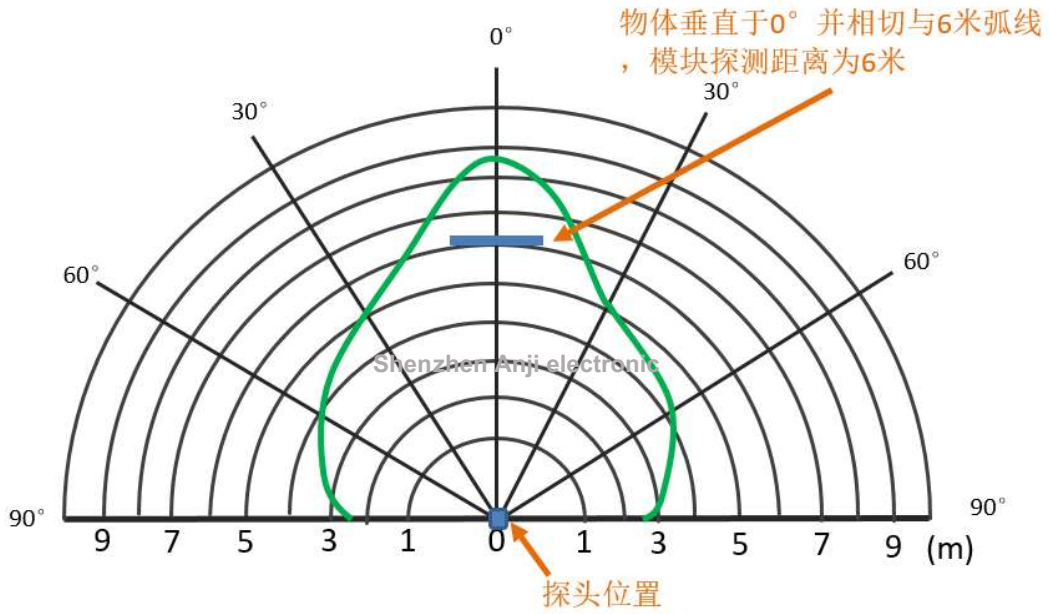


Beam angle: an ultrasonic transducer along the extended line of the central axis of the ultrasonic sensor at the time of emission (perpendicular to the sensor surface) Ultrasonic energy rays ° on the line) the direction of maximum. Other acoustic energy whereby outward direction gradually weakened. In the line of extension of the axis of the sensor axis, whereby the outwardly to an energy intensity is reduced by half (- 2dB) At this angle it is called beam angle.

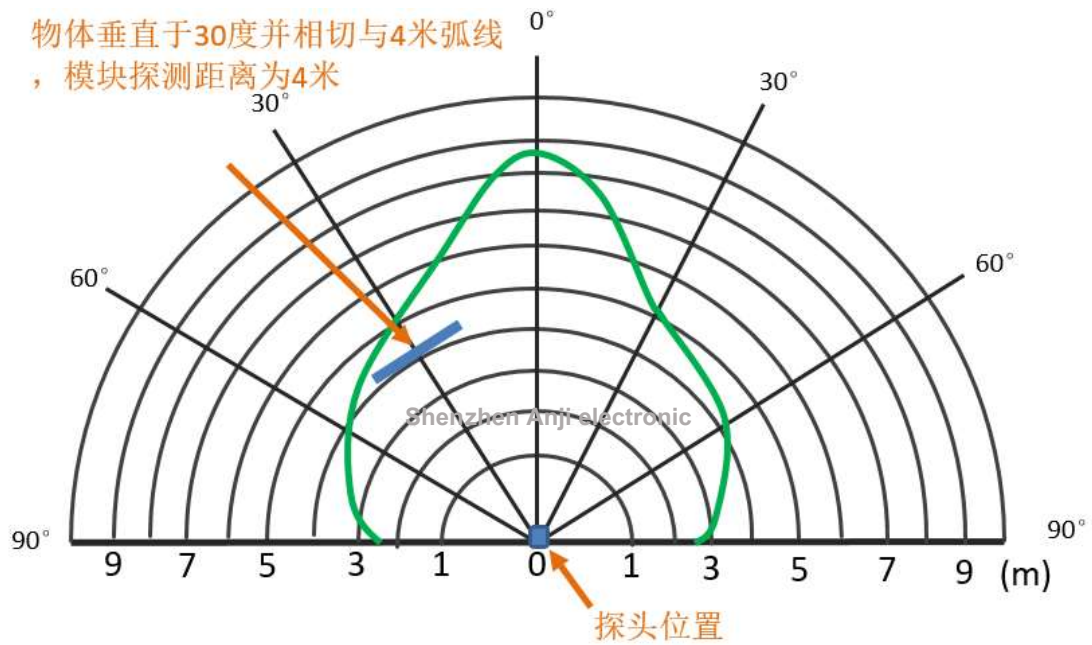
Select Location

Requirements: the object beam angle should be within the range, as far as possible perpendicular to the axis and tangent to the arc.

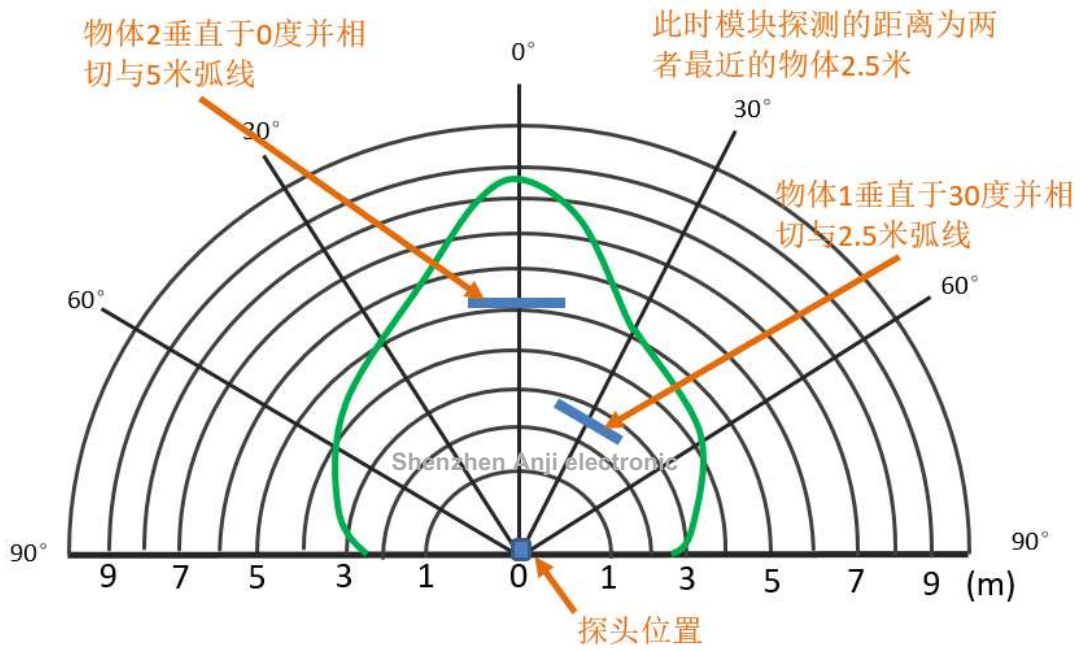
Case 1:



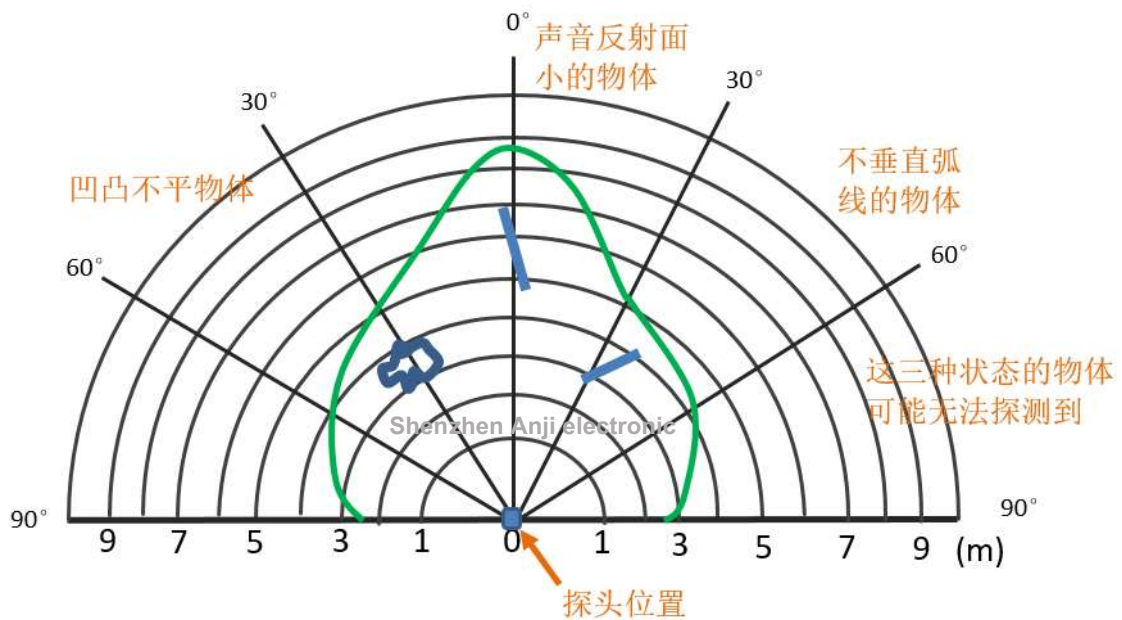
Case 2:



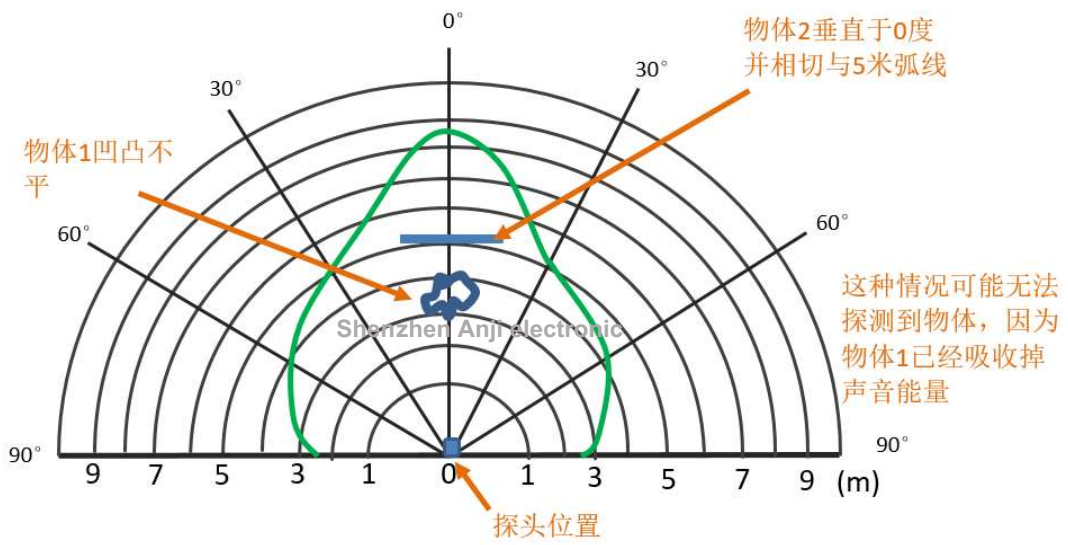
Case three:



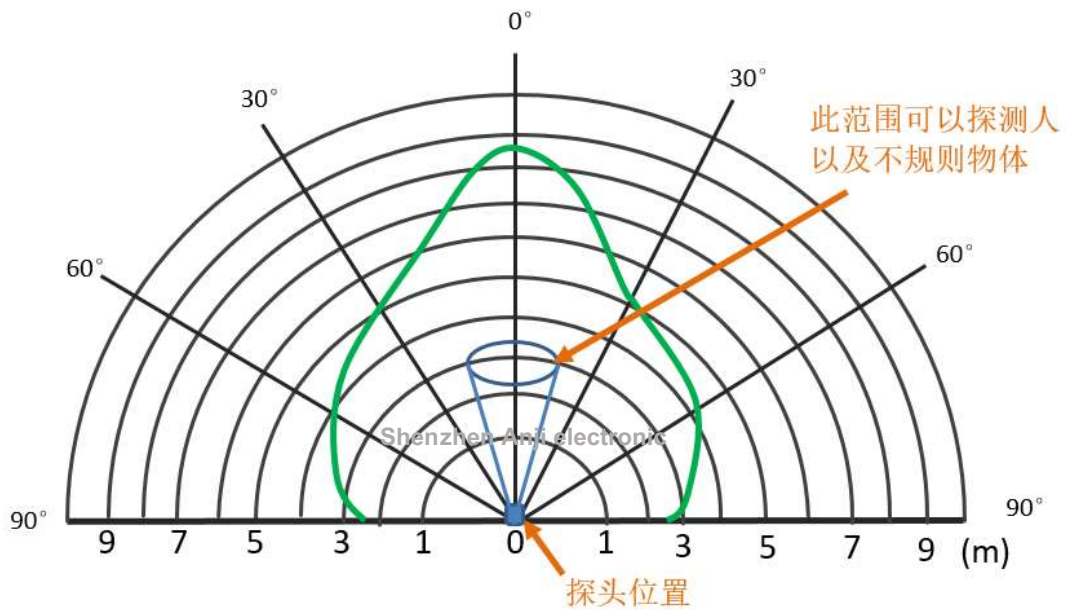
Case four:



V.:



Measuring range of people



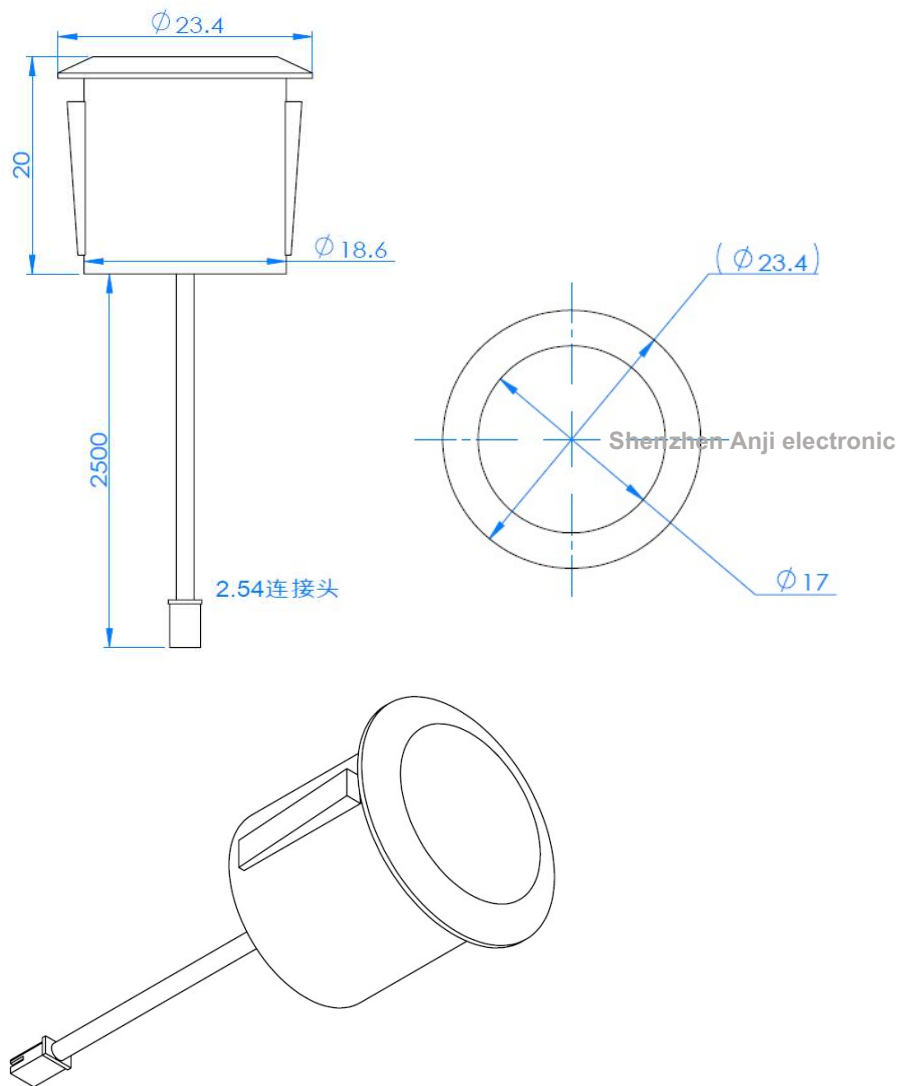
>> Precautions:

- ① Module detects a minimum distance 20cm, an object within 20cm, inaccurate signal obtained
- ② When ranging, the object area is not less than 0.2 m2 as flat and planar, otherwise it will affect

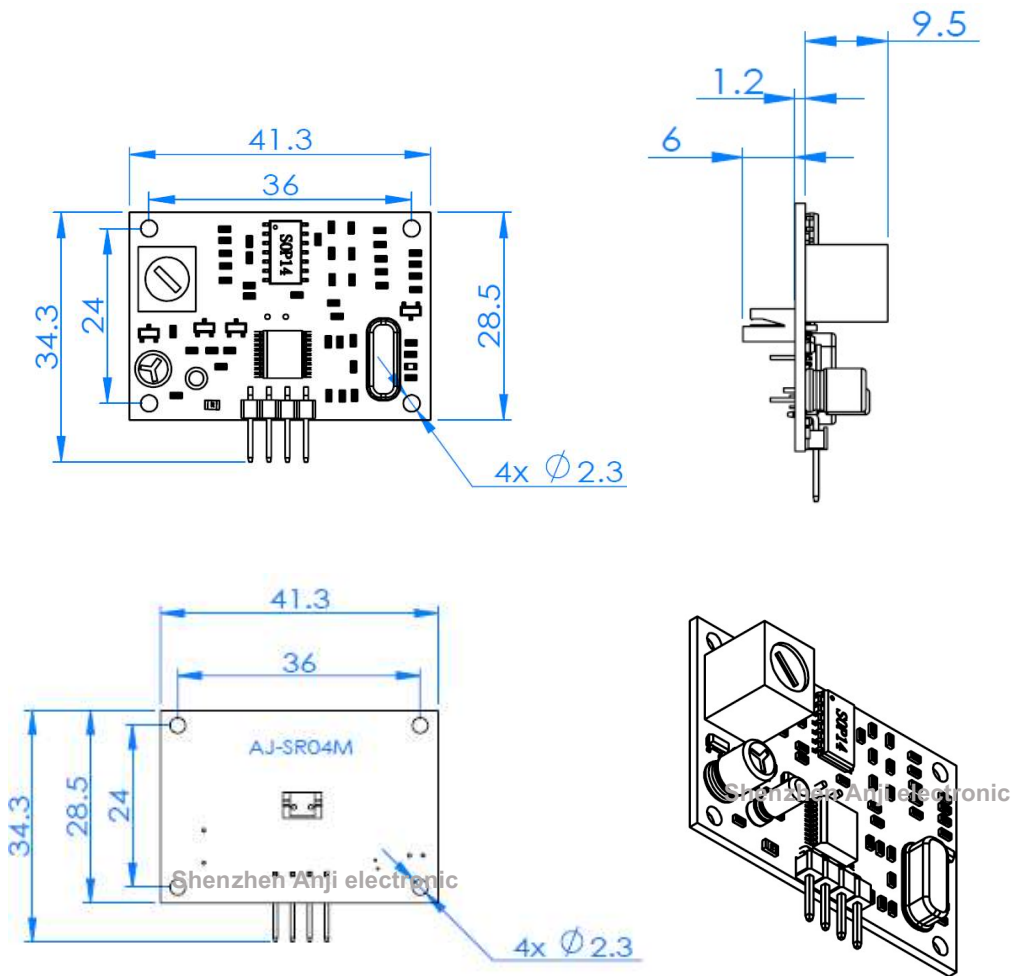
Test Results;

>> Product Size

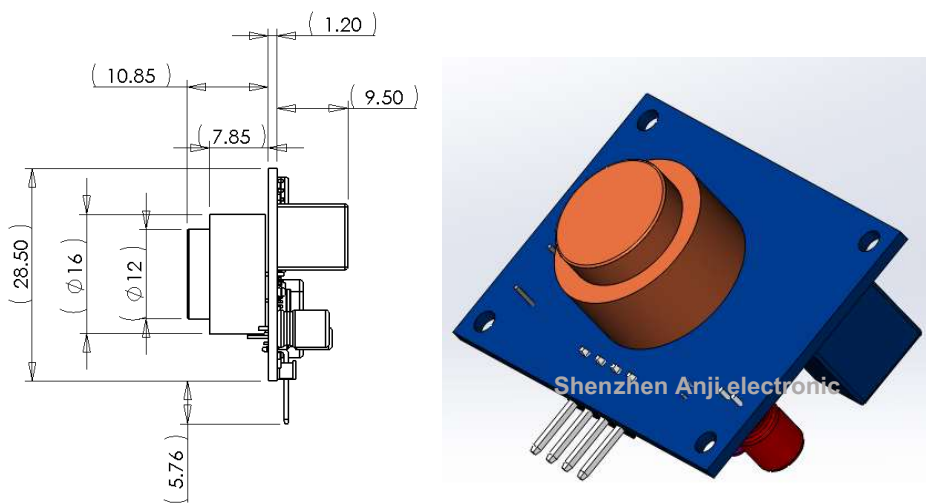
Strip line ultrasonic transducer size



Control Board Size stripline



Onboard transducer Board Size



END

Thank you for reading