

# Ultrasonic Sensor 超声波传感器



## Model BM12-120I -Y1

### INSTRUCTION SHEET 说明书

Thank you for selecting DADISICK product. This sheet primarily describes precautions required in installing and operating the product.

Before operating the product, read the sheet thoroughly to acquire sufficient knowledge of the product. For your convenience, keep the sheet at your disposal.

感谢选择大迪科技的产品。这份说明书主要目的是描述在使用和操作本产品的预防措施。在使用本产品之前，请务必仔细阅读本说明书获取必备的产品信息。为了维护方便，建议保留本说明书。

This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.

超声波传感器在某些特殊的环境可能会引起雷达干扰，在这种环境下需要使用者采取必要的措施来减少干扰。

### Precautions for Correct Use 使用说明

1. 请及时除去超声波探头表面的水滴，以免影响超声波探测的距离。
2. 超声波传感器用于探测固体、液体和粉末。但是探测的距离和效果会受到物体介质表面状态影响。
3. 在探测平整和表面光滑的物体时，安装超声波传感器时，建议探头正对物体表面90度正负3度以内为最佳。
4. 温度和湿度对超声波传感器的影响  
一般来说，当温度变化1度时，声速会随着变化大约0.17%。同时，在一定的模型中，也会随着干空气和湿度变化影响大约1%，这些变化会影响超声波传感器检测的精准度。超声波传感器的温度补偿功能，通电10分钟之内距离检测误差在1.7%之内，10-25分钟误差0.3%，25分钟之后趋于稳定。
5. 大气的的影响  
超声波传感器是通过空气为介质来工作的。如果在传输过程中有温度变化、反射或者衍射情况发生，或者强风都会引起超声波传感器的异常。请避免在有强风的环境中使用超声波传感器。
6. 请不要使用油漆稀释剂，苯，丙酮和煤油清洗超声波传感器。
7. 在连接和断开连接超声波传感器之前，务必断开电源。

1. Please remove the water drops on the surface of the ultrasonic probe in time to avoid affecting the ultrasonic detection distance
2. Ultrasonic sensors for solids and liquids. However, the detection distance and effect will be affected by the surface state of the object medium
3. When detecting flat and smooth objects, when installing ultrasonic sensor, it is recommended that the probe is facing the object surface within 90 degrees plus or minus 3 degrees
4. Influence of temperature and humidity on ultrasonic sensor  
Generally speaking, when the temperature changes by 1 degree, the sound velocity will change by about 0.17%. At the same time, in a certain model, it will also affect about 1% with the change of dry air and humidity. These changes will affect the detection accuracy of the ultrasonic sensor. The temperature compensation function of the ultrasonic sensor. The distance detection error is within 1.7% within 10 minutes of power on, 0.3% within 10-25 minutes, and tends to be stable after 25 minutes.

5. Atmospheric impact  
Ultrasonic sensor works through air as medium. If there is temperature change, reflection or diffraction during transmission, or strong wind will cause the abnormality of the ultrasonic sensor, please avoid using the ultrasonic sensor in the environment with strong wind.

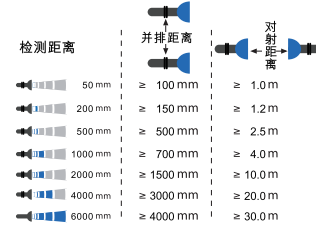
6. Please do not use paint thinner, benzene, acetone and kerosene to clean the ultrasonic sensor

7. Be sure to disconnect the power supply before connecting and disconnecting the ultrasonic sensor

### ■ 安装间距

在分别使用同型号的两个或者多个传感器时，安装时距离太近会发生传感器的同频干扰，造成不同传感器的输出异常。为了避免发生这种情况，安装时，同型号多只传感器之间需要保留足够的距离。

建议安装距离如右图：

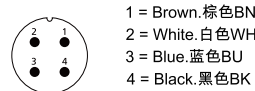


Detection distance/Side by side distance/Shooting distance

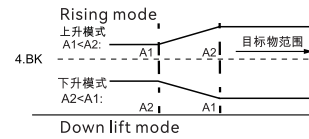
### Installation spacing

When using the same type of two or more sensors separately, the simultaneous interpreting of the sensor's frequency will cause the abnormal output of different sensors. In order to avoid this situation, sufficient distance should be reserved between multiple sensors of the same model during installation. The recommended installation distance is shown in the right figure

### ■ 电气连接/输出方式 Electrical connection / output mode



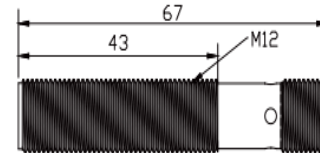
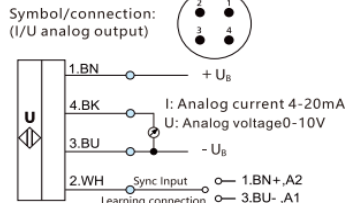
### 输出方式 Output mode



### ■ Dimensions(mm) · 尺寸



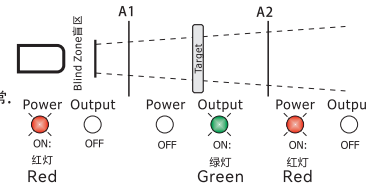
### 电气连接 Electrical connection



### ■ 工作指示灯状态 Output mode

- 电源红灯亮：正常工作。
- 信号输出绿灯亮：检测到目标物，信号输出正常。
- 绿灯闪烁：处于A1,A2学习模式，闪烁3次以上。
- 绿灯熄灭：没有检测到目标物。

- Power red light on: normal operation
- The signal output green light is on: the signal output of the target object is detected to be normal.
- Green light flashing: it flashes more than 3 times in A1 and A2 learning mode
- Green light off: no object detected



### ■ Configurations · 参数

检测范围 Detection range	20-120mm
盲区 Blind area	0-20mm
输出 output	单模拟电流4-20mA Single analog current 4-20mA output
分辨率 Resolving power	0.1mm
重复精度 Repetition accuracy	满量程值的±0.15% ± 0.15% of full scale value
精度 Accuracy	±1%(内置温度漂移补偿) ± 1% (built in temperature drift compensation)
响应时间 Response time	18ms
上电延时 Power on delay	<500ms
工作电压 Working voltage	10-30V DC, 反极性保护 10-30V DC, Reverse polarity protection
LED 红灯 Led red light	无目标常亮,学习时无目标闪烁 No target is always on, and no target flashes during learning
LED 绿灯 Led green light	检测到目标常亮,学习时有目标闪烁 It is detected that the target is always on, and the target flashes during learning
过载保护 Overload protection	200mA, 红灯绿灯同时闪烁 200mA, red and green lights flash at the same time
负载阻抗 Load impedance	I/ 0 ~ 300 Ohm, U/> 1k Ohm
空载电流 No load current	≤30mA
输入类型 Input type	带同步功能和学习功能 With synchronization function and learning function
材质 Texture of material	铜套镀镍, 塑料, 玻璃填充环氧树脂 Copper sleeve, nickel plated, plastic, glass filled epoxy resin
防护等级 Degree of protection	IP67
连接类型 Line type	5 芯 M12 连接件 5-core M12 connector
环境温度 Ambient temperature	-25°C ~ +70°C (248 ~ 343K)
储存温度 Storage temperature	-40°C ~ +85°C (233 ~ 358K)
重量 Weight	38g

### ■ 设置检测范围(A1,A2点) Set the detection range (A1, A2 points)

模拟量输出的超声波传感器,对应的测试范围的两个边界点可设置。设置方法是将 TEACH-N学习线分别连接电压-UB或者+UB来实现,连接时间至少为指示灯闪烁3次。在设置过程中,LED灯指示传感器是否检测到目标物。TEACH-小N学习线连接-UB时设置A1点,连接+UB时设置A2点。

For the ultrasonic sensor with analog output, the two boundary points of the corresponding test range can be set.

The setting method is to connect the teach-n learning line with voltage - UB or + UB respectively, and the connection time is that the indicator flashes at least 3 times.

During the setting process, the LED light indicates whether the sensor detects the target. Set A1 point when connecting with Ub and A2 point when connecting with + UB.

可选下列两种不同的输出模式

1. 模拟量输出值随距离的增加而增加(上升模式)
2. 模拟量输入值随距离的增加而减小(下降模式)

The following two different output modes are available.

1. The output value of analog quantity increases with the increase of distance (rising mode).
2. The analog input value decreases with the increase of distance height (descent mode).

开关点只能在接通电源的3分钟内进行设定。

如果稍后修改开关点,用户可以在重新上电后进行设定。

设置上升模式(A2>A1)

- 1.将目标物放在近点位置。
- 2.接 TEACH-N学习线与UB设置A1点,直至绿色指示灯闪烁3次以上,断开连接。
- 3.将目标物放置在远点位置。
- 4.连接 TEACH-N学习线与+UB设置A2点直至绿色指示灯闪烁3次以上,断开连接。

The switching point can only be set within 3 minutes of power on.

If the switching point is modified later, the user can set it after power on again.

Set rising mode (A2 > A1)

1. Place the target near the point.
2. Connect the teach-n learning line and UB to set A1 point until the green indicator flashes more than 3 times and disconnect.
3. Place the target at the far point.
4. Connect the teach-n learning line and + UB to set A2 point until the green indicator flashes more than 3 times and disconnect.

设置下降模式(A1>A2)

- 1.将目标物放在近点位置
- 2.连接 TEACH-IN学习线与+UB设置A2点,直至绿色指示灯闪烁3次以上,断开连接
- 3.将目标物放置在远点位置
- 4.连接 TEACH-N学习线与-UB设置A1点,直至绿色指示灯闪烁3次以上,断开连接。

出厂设置

A1: 最小检测数值  
A2: 最高检测数值

工作模式:上升模式

Set chamber descent mode (A1 > A2)

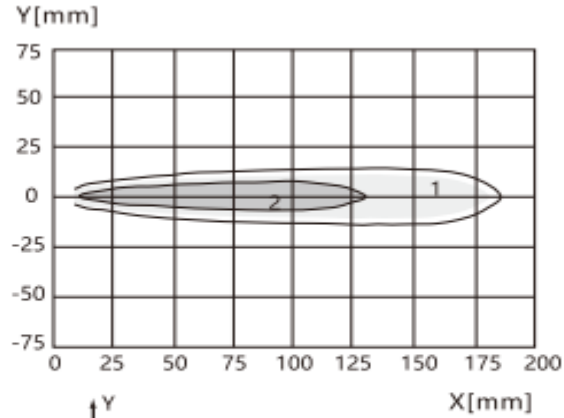
1. place the target near the point
2. Connect the teach-in learning line and + UB to set A2 point until the green indicator flashes more than 3 times and disconnect
- 3 place the target at the far point
4. Connect the teach-n learning line and - UB to set point A1 until the green indicator flashes more than 3 times and disconnect.

Factory settings

A1: Minimum detection value  
A2: Maximum detection value

Working mode: rising mode

## ■ BM12-120I -Y1 声波参考曲线图 Acoustic reference curve



curve1: flat 10mmx10mm  
curve2: round bar, Ø8mm **BM12-120**

Observe the following precautions to ensure safety.

1. Do not use the Sensor in Locations subject to explosive or flammable gases.  
请不要在易爆或易燃气体的环境中使用超声波传感器。
2. Do not use the Sensor in environments subject to exposure to water, oil, chemicals etc.  
请不要在水,油和有腐蚀化学物质中使用超声波传感器。
3. Do not attempt to disassemble, repair, or modify the Sensor.  
请不要拆解, 维修和改装超声波传感器。
4. Connect in the specified wiring order when connecting the sensor terminals.  
安装之前,务必确认正确的连线方式。
5. To ensure safety in operation and maintenance, do not install the Sensor near High-voltage equipment or power devices.  
为了安全运转和维护,请不要安装将超声波传感器安装在高电压或电源设备附近。
6. Do not use the Sensor in locations subject to direct vibration or impact.  
请不要将超声波传感器安装在有共振和受共振影响的地方。
7. Do not connect or disconnect connector or attempt wiring work while power is supplied. The product may be damaged and electric shock may result.  
请不要带电插拔本产品。
8. When disposing of the Sensor, treat it as industrial waste.  
在报废超声波传感器时,请按照电子工业品标准回收处理。

### Suitability for Use

DADISICK Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buy' s application or use of the Product. At Buyer' s request, DADISICK will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer' s application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS,AND THAT THE DADISICK PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.