

# TECHNICAL DATA SHEET

## GROOVE TAG DETECTION ULTRASONIC SENSOR CSDB series



Figure can vary

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- Basic principle
- Application
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**RoHS** **CE**

## The basic principle of ultrasonic sensors

Ultrasonic sensors utilize the characteristics of sound waves to provide a non-contact and accurate detection scheme for detecting the state and distance of objects.

Sensors emit high-frequency mechanical sound waves and receive reflected sound waves when encountering objects. By calculating the time or energy between emitting and receiving sound waves, they obtain the precise distance or state of the target object as an ultrasonic sensor.

Ultrasonic sensors are suitable for detecting objects in different states, such as liquids, transparent materials, reflective materials, and particles. It can be applied in harsh environments without being affected by the color of the target object, as well as dust, water mist, and other factors in the air.



Ultrasonic sensors can detect almost all liquids, such as pure water, oil, and various solvents; Detect various transparent and reflective materials such as glass bottles, glass panels, transparent PP/PE/PET films, etc; Ultrasonic sensors can perform excellently in detecting reflective materials such as gold foil and silver foil.

Almost all fiber fabrics of different colors can be easily detected by ultrasonic sensors; Used to detect grains and automatically control material levels; The automatic control of powder material levels such as coal, sawdust, and cement is also very suitable.



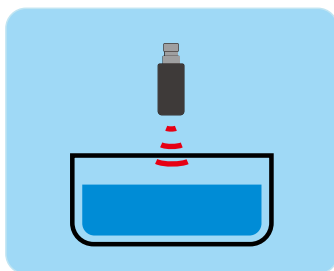
## Application of ultrasonic sensors

Ultrasonic sensors have shown excellent performance in non-contact positioning and distance measurement applications.

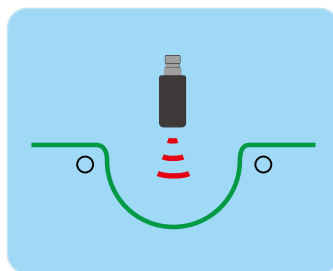
Not affected by color and shape, and not limited by the material of the tested target, it has been widely used in industrial automation scenarios.

Below are some typical applications in the industry.

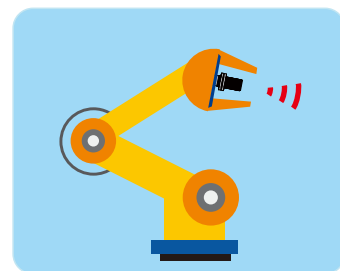
- Environmental detection and control
- Mechanical manufacturing and engineering
- New energy manufacturing equipment
- Water level and material level monitoring and control
- The automotive industry
- Mobile devices
- Material handling
- Printing, paper and post-press processing
- Packaging machinery
- Process equipment
- Gating
- Textile machinery



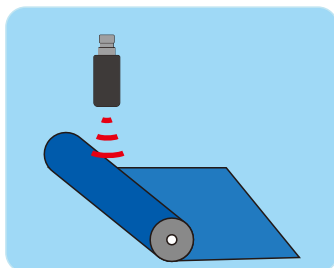
Liquid level detection



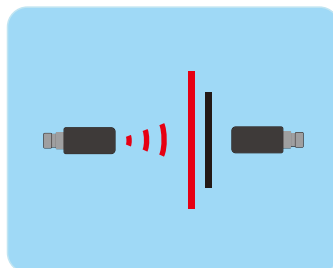
Tension control



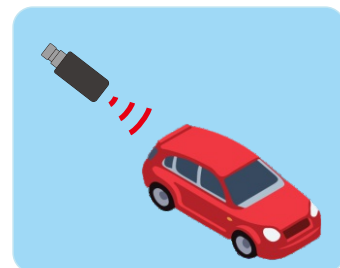
Robot arm positioning



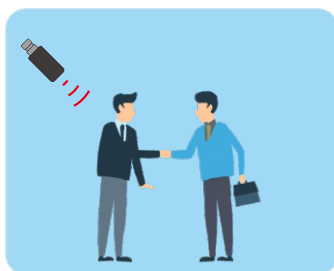
Roll diameter detection



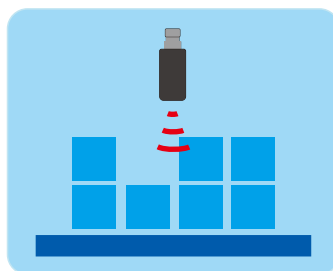
Double sheet detection



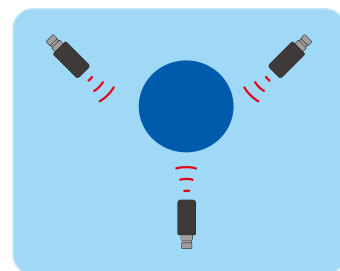
Positioning



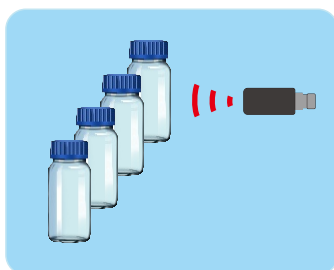
Human detection



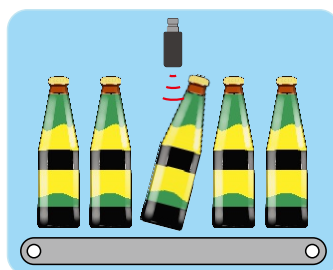
Stacking height control



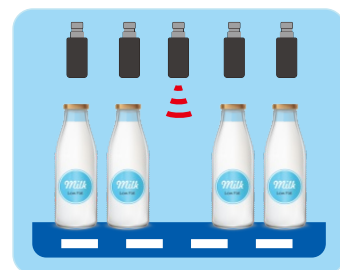
Blowing film machine control



Transparent object detection



Quality control



Packing control

## Performance parameters

### Features

Slot design, able to recognize transparent, opaque, and printed labels

Response time: 250μs

PNP+NPN switch output

The top of the sensor housing is equipped with one LED indicator light and one switch button

By learning the demonstration function, debugging is simple and fast



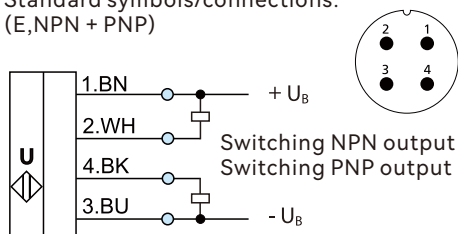
Model	CSDB
Groove depth	68mm
Slot width	5mm
Minimum detectable object	Gap between labels/label size: 5mm
Switching frequency	1.2kHz
Input type	With synchronization and learning functions
Switching output	PNP + NPN
Weight	105g

Electrical data	
working voltage	10~30V DC, reverse polarity protection
Output current	100mA
Response time	250μs
LED yellow light	No target (air)
LED red light	Double sheet detected
LED green light	Leaflet detected
Structural style	Channel shape
material quality	metal, aluminum
Line type	4-pin M8 connector
Protection level	IP67

Environmental parameters	
Ambient temperature	-25°C~+70°C (248~343K)
Storage temperature	-40°C~+85°C(233~358K)

## Electrical connection

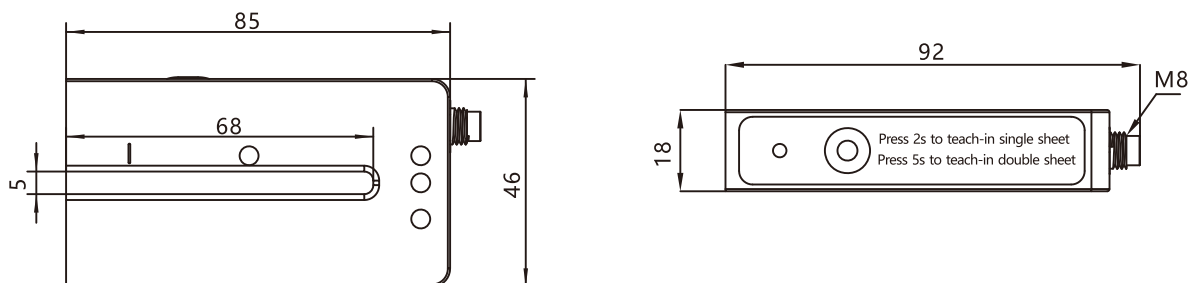
Standard symbols/connections:  
(E,NPN + PNP)



Wire core color coincidence : EN 60947-5-2

## Dimensions (unit:mm)

CSDB series



## Function Description

The CSDB ultrasonic groove sensor is used to identify the printing method of labels and carrier materials, as well as the transparency and surface roughness of the material, and can identify whether the material is one or two layers. For example, the transparent label on the transparent carrier material and the different printing patterns on the label. The CSDB ultrasonic groove sensor can recognize labels with a minimum spacing of 2mm, and has high positioning accuracy, short response time, and small size, which makes the application of groove sensors very common. The ultrasonic principle of CSDB sensors is based on signal attenuation caused by different material thicknesses.

## Learn and teach function

Power on status:

Air yellow light, single green light, double red light;

Learning status:

- ① When the button is long pressed for >2s, the green light will start to flash. At this time, release the button to automatically learn the leaflet (if successful, the green light will continue to flash 3 times; if it fails, the red light will flash 3 times);
- ② When the button is long pressed for more than 5 seconds, the green light will switch from flashing green to yellow. Release it to automatically learn double sheets (if successful, the green light will flash 3 times; if it fails, the red light will flash 3 times);
- ③ When learning a single sheet, the double sheet threshold will be automatically completed, and the work will start automatically after the learning is completed. The learning function has no time limit.