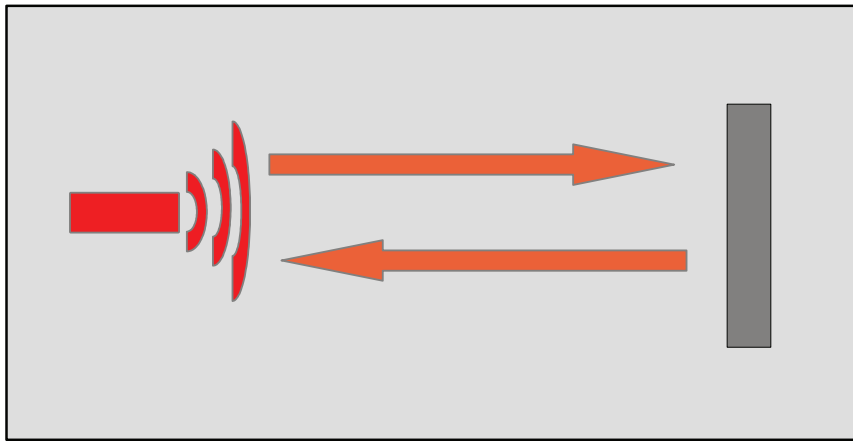# Ultrasonic measuring

measuring like a bat

large application area such as:

- distance measurement

- object detection

- position control

- Level Measurement

- Web Tension

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Methods of Operation

"Measuring like a bat".. Bats use the ultrasonic principle for finding their way. They emit high frequency sounds and use the echoes reflected by the objects to re-organise their position and distance.

Our ultrasonic sensors use also ultrasonic principle of bats to send and receive sound waves. After being reflected from the object to be measured, the signals are received by sensors and decoded. The recorded time of flight is temperature compensated and converted to distance data.

Benefits:

• Sealing IP67
• Easy handling
• High resolution
• Large detection range
• Short minimum distance

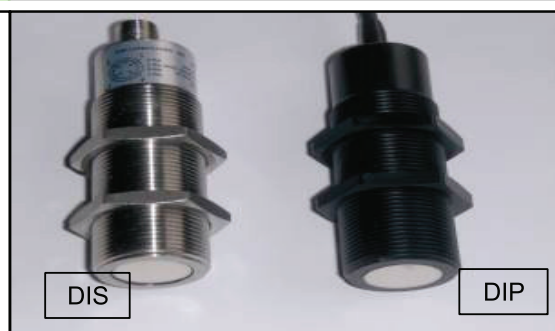## Areas of use:

The following list present some examples.

• Level measurement of bulk storage and liquids in vessels;
  e.g.: water tanks, corn silos, oil container
• Distance measurement of objects and parts in motion;
  e.g.: stop of machinery, crane action, collision control of lift track
• Detection of moving objects made of all types of material;
  e.g.: metal, plastic, glass on conveyor band
• Presence detection of objects and people;
  e.g.: occupied parking place in parking garage, door opener
• Safety control of objects and people;
  e.g.: danger area of machinery, door control, alarm system
• Completeness check of objects;
  e.g.: products in packaging box, level of oil in oil barrel
• Winding and unwinding control;
  e.g.: coils in the paper and textile industries, steel-plate coils

level measurement

distance measurement

detection of moving objects
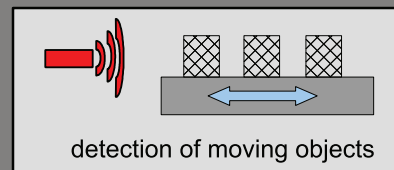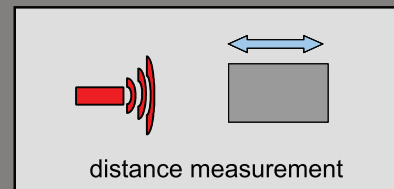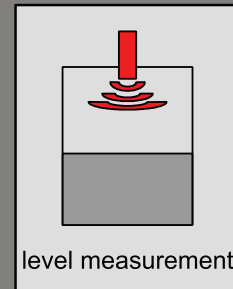
Pic. 1: Areas of use (examples)

ultrasonic sensor

sending

reflection

pick up echo
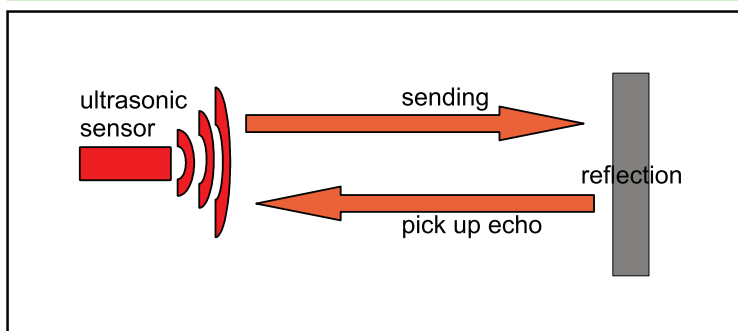
Pic. 2: Principle of ultrasonic

DIS

DIP

Pic. 3: Sensor type DIS (metal version) and DIP (plastic version)

Technical data overview of actual ultrasonic sensors

plastic version DIP	DIP-01-U	DIP-01-I1	DIP-01-I2	DIP-01-D1	DIP-02-01
metal version DIS	DIS-01-U	DIS-01-I1	DIS-01-I2	DIS-01-D1	DIS-02-01
output	analogue	analogue	analogue	switching	analogue + switching
output characteristic	analogue	analogue	analogue	switching	analogue + switching
setting	fix adjusted	fix adjusted	fix adjusted	fix adjusted	programmable
signal outputs	0 – 10 V	4 – 20 mA	0 – 20 mA	digital 0 / 20 mA	1.) 0-10V 2.) 4-20mA 3.) 0-20mA 4.) digital 0 / 20 mA
blind zone	fix, 300 mm	fix, 300 mm	fix, 300 mm	steplessly variable	steplessly variable
switching outputs	- - -	- - -	- - -	1, steplessly variable	1, steplessly variable
switching windows	- - -	- - -	- - -	steplessly variable	steplessly variable
hysteresis	- - -	- - -	- - -	steplessly variable	steplessly variable
interface	- - -	- - -	- - -	- - -	USB

housing	Ø = 30 mm
housing material	type DIP = plastic type DIS = stainless steel
sensing distance	0,3 – 3 m
resolution	0,1 mm
repeatabilityit	0,1%
linearity	0,2%
beam angle	11°
response time	adjustable
switching frequency	16 Hz
operating voltage	18 – 30 V
current consumption	abbr. 50 mA
sealing	IP 67 / 65

DIP

DIS

Pic. 4: product sere DIS (metal version) and DIP (plastic version)

important technological parameters

measuring objects: The most of sound reflecting materials can be measure. Even sound absorbing materials such as wadding or rubber can be detected. The sensor can be measure solid, liquid or even powder. Important is als the possibility to detect transparent objects.

measurement range: The measurement range is defined by the maximum and minimum measurement distance.

minimum distance, blind zone: Ultrasonic sensors are using a single transducer for transmitting and receiving of the ultrasonic pulse. Because the transducer cannot carry out both processes simultaneously, a zone (= blind zone) in front of the sensor is created, in which the position of a target cannot be determined.

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