

Ultrasonic distance measuring system

UAS



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The ultrasonic distance measuring system **UAS** facilitates non-contact distance measuring in gaseous mediums on resounding surfaces, such as metal, glass, wood, liquids, and many types of fabrics. Whereby measuring accuracy amounts to +/- 100µm!

Ultrasonic distance measuring is carried out according to the impulse-echo method, by which the distance to the test object is calculated on the basis of the running time of an acoustic impulse from the sensor to the reflecting object and back. A pulse generator produces a short transient, which effects mechanical oscillations of the elastic electrode of a sensor, and thus transmits a directed and bunched sound wave into the adjacent medium. That part of the sound wave, which has been reflected from the test object and arrived back at the sensor, is again converted into an electric impulse and amplified. By means of a clock generator, the sound's running time from transmission to reception of the reflected impulse is separated into paces of 0.05mm air gap. The single paces are counted, evaluated, stored and transmitted to the data interface for further processing. The meter reading stored during a measuring period indicates the distance between sensor and test object with a definition of max. 0.05mm air gap.

The measuring range starts from the sensor's front rim +30mm up to approx. 2mtr for passive sensors without auxiliary reflector. For sensors with auxiliary reflector, the measuring range starts approx. 30mm behind the auxiliary reflector in the sound's direction. Sensors with auxiliary reflectors are always used in cases, where highly accurate measurements are required. For measurements allowing for an accuracy of $\geq 3\text{mm}$, or for relative measurements, no auxiliary reflector is required.

Measuring accuracy solely depends on the sensors employed, and on environmental conditions. The ultrasonic measuring system always operates with a default definition of 25µm. This is determined by the hardware employed, and by the pulse sequence. All calculations are performed with 32 bit floating point arithmetic.

This innovative ultrasonic measuring device has the following remarkable features:

- ◆ **High measurement frequency of up to 200Hz by using a micro controller**
 - ◆ **RS 232 interface and analogue current- and voltage exit**
 - ◆ **measurement value display on 5-digit LC-display**
 - ◆ **running-time dependent amplifying adjustment of ultrasonic sound**
 - ◆ **reset of latest measurement value for relative measurements**
 - ◆ **all system parameters adjustable via interface**
 - ◆ **tolerance contacts**
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The UAS system has been designed for fitting different ultrasonic converters:

- ⇒ Sell radiator for highly accurate measurements, $\pm 0.1\text{mm}$ on short range
- ⇒ piezoceramic sound converter for measuring longer distances (up to 10mtr)

Accessories:

- extension lead for ultrasonic sensors with LEMOSA sockets
- power unit 220VAC/24VDC

Technical Data:

Power supply:	18...32 VDC; 12V optional
Power intake:	<120mA at 24V
Measuring method:	impulse-echo method with reference reflector
Measuring range:	70mm - 2000mm, measured from sensor's front rim
Definition:	internal 0.025mm, external +/- 0.1mm
Analogue exit:	0...10V of 0...20mA 4095 paces in selected measuring range Attention! Either the voltage- or the power exit can be optimal calibrated.
Serial interface:	V 24 RS 232
Baud rates:	75,150,300,600,1200,2400,4800,9600 Baud
Valid exit:	reacts to echo failures echo O.K.: +12V echo missing: -12V max. power permitted: 10mA
Sensor's bias voltage:	max. 300V! adjustable with software
Display:	5-digital LED Display

Key button for calibration to a pre-set value per interface at a measured distance.

Subject to technical changes due to instrument improvements.
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