



Ultrasonic sensors



Precise, versatile

The elobau ultrasonic sensors

The principle of ultrasonic technology is as easy as it is effective. Ultrasonic sensors send sound waves towards their target object in the high-frequency ultrasonic range. This object reflects the signal, which is again received by the sensor. The distance is then calculated from the propagation time. This measurement principle can be used not only to measure distances, but also to determine the position of objects. This makes the ultrasonic sensor an all-rounder that can be used for a variety of measuring and monitoring tasks.

elobau ultrasonic sensors – the precise, flexible and reliable solution for every application. Both in industrial environments as well as in challenging off-highway uses, the ultrasonic sensors are the right choice thanks to the robust design of the housing. Its contactless function principle guarantees the precise detection of liquid, solid, granular or powdery substances – even in extreme environmental conditions. Ultrasonic sensors deliver reliable data even in the event of precipitation, dust, smoke and extreme temperatures. Vibrating sound converters help to prevent media from adhering to the sensor. The range of the sensors sets standards as well – measurements at distances of up to 8000 mm are possible.

Fits everywhere. Different cylindrical designs enable easy integration into the machine. In addition, the various operating modes of the sensors in combination with different analogue and digital outputs offer the right solution for nearly every possible application. Synchronisation and multiplexing serve to prevent crosstalk between the sensors, thereby guaranteeing trouble-free function even in situations with limited installation space. Compliance with the ATEX guideline expands the already broad range of applications into the field of potentially explosive areas.

Keep it simple. Highly visible LEDs or an additional display help the user quickly detect distance, fill level and switching state. The simple and fast configuration with IO-Link, teach-in button or teach-by-wire saves time and costs.

IO-Link

elobau ultrasonic sensors are IO-Link compatible and, thus, "Industry 4.0 ready".

IO-Link offers the possibility to communicate from the control down to the lowest level of automation – the field level – and thereby drive digital networking. IO-Link is a standardised and universal interface based on point-to-point connection that can communicate with all common fieldbuses. Automation can thereby be designed even more efficiently. IO-Link convinces here with simplified wiring, device diagnostics and a reduction in standstill times through simple configuration. Use IO-Link and make your machines fit for the Internet of Things. The use of IO-Link sensors simplifies warehousing. By using a defined data master, a sensor can be used for a wide variety of different tasks at the machine.



and reliable

U*18S ultrasonic sensor

Thanks to the compact and robust design, the U*18S is the optimum solution for difficult application conditions. In combination with selectable output forms, the space-saving version offers flexibility for measuring and switching applications. In addition, this series can be used either as a diffuse reflection sensor or as a retro-reflective sensor.

U*18 ultrasonic sensor

Ultrasonic sensors of the U*18 series offer maximum functionality and precision, even under demanding conditions – including in potentially explosive environments. Two different housing materials, operating range of up to 2.2 metres, four operating modes and various output forms leave no task unsolved. Simple configuration, either via teach-in button or IO-Link, also ensures high system availability. Synchronisation as well as multiplex mode ensures high process reliability even when operating multiple sensors simultaneously.

U*30 ultrasonic sensor

Thanks to high-performance electronics, the U*30 series is the ideal partner for the wide-range detection of objects and filling heights at distances of up to 8 metres. Similar to all other cylindrical designs from elobau, the sensors are temperature-compensated for high accuracy even in case of temperature fluctuations. Stainless steel or plastic variants allow flexible adaptation to a wide variety of requirements.



UDA18 ATEX ultrasonic sensor

UDA18 ATEX ultrasonic sensors have the same functions and features as the sensors of the U*18 series. They were, however, developed especially for use in areas potentially subject to gas or dust explosion. They have ATEX approval, making them suitable for use in the chemical and pharmaceutical industries as well as in systems that process oil and gas.

2UF Off-Highway ultrasonic sensor

This special version of the ultrasonic sensor is specially designed to reliably detect the fill level of mobile machines. The extreme temperature range as well as the high protection class are essential for use in these applications. Precise measurement of agitated media, or while on an incline is also possible with the optional use of a focus tube. In addition to mobile applications, stationary applications are always possible for the 2UF. The fill level is output via either a voltage or current output.

2U Industry ultrasonic sensor

The 2U Industry ultrasonic sensor is ideal for reliable and precise measurement in adverse industrial environments. This series offers a suitable solution for almost every application. Different analogue output signals are available, which combined with up to four switching outputs ensure this series offers a suitable solution for almost every application. The easy to read display and the teach-in button allow quick and easy configuration. The rotatable head provides additional flexibility for mounting in difficult installation situations.

Flexible in function

DISTANCE MEASUREMENT

1 Detection of fill levels

Ultrasonic sensors are the ideal solution for reliably and precisely detecting the fill level of liquid and solid media in a container. Nearly every material can be detected with ultrasound, regardless of whether it has a glossy, matt or even transparent surface. The range also speaks for the use of ultrasonic sensors – sensors from elobau offer precise measurement even over distances of up to 8000 mm. The height of the fill level in a container can be detected through continuous measurement and output via either an analogue signal and / or via two switching signals.

2 Use on agricultural machinery

When cultivating farmland, ultrasonic sensors are used to conserve resources and protect machines. Mounted to the booms of sprayers, they detect unevenness in the ground and the different heights of plants that are in the growing phase. The boom can thereby maintain a constant distance, allowing collisions with the ground and damage to plants to be avoided. This also ensures the optimum distribution of expensive plant protection products, allowing the operator to concentrate fully on controlling the machine.

Lateral attachment of the ultrasonic sensor to sprayer's reservoir container allows gaps to be detected between fruit trees on fruit farms. This guarantees that plant protection products are applied only to trees and not sprayed in the gaps between them. Ultrasonic sensors thereby improve the efficiency of farmland cultivation, reduce stress on the environment and lower costs for the farmers.

Due to their high protection classes and operating range, ultrasonic sensors are very well suited for outdoor use and in agricultural areas.



Suitable for every application



OBJECT DETECTION

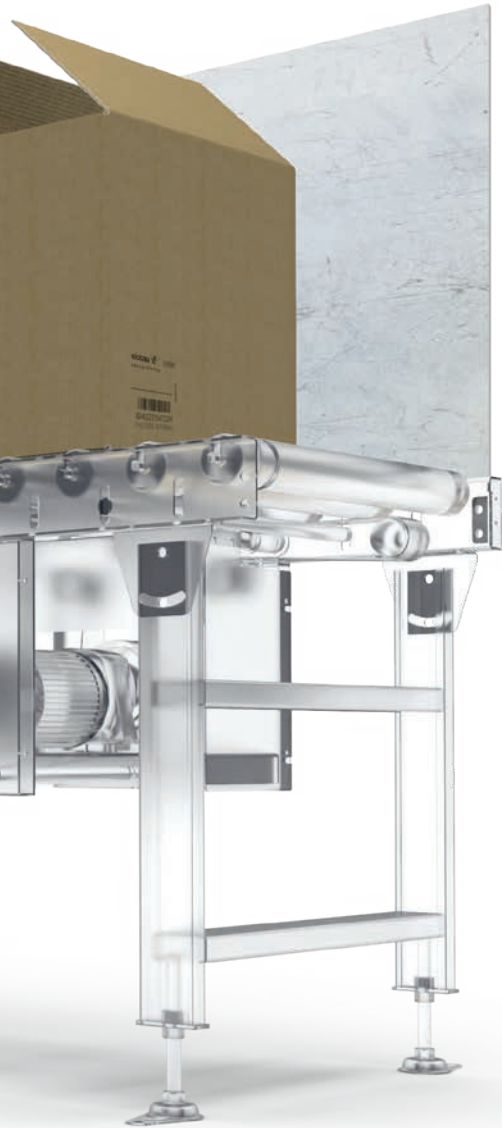
3 *Counting objects*

In the packaging industry, ultrasonic sensors are the perfect solution for reliably counting objects. With the retro-reflective mode, the ultrasonic sensor reliably and quickly detects objects of many different types, regardless of whether they are positioned so as to be sound absorbing or sound avoiding. This is made possible through the use of a reference reflector.

The reflector is ideally a plate with a smooth surface. Materials such as metal or plastic are particularly well-suited to this. Existing backgrounds, such as walls, floors or conveyor belts, can also be used as reflectors, however.

When counting objects, a slight deviation of the ultrasonic signal to the reference reflector caused by the presence of an object results in a switching signal. Each signal is counted, thereby allowing a reliable count to be determined.





POSITION DETECTION

4 *Monitoring of roll thickness*

The smallest changes in the diameter of rolled materials can be detected with ultrasonic sensors. Even reflective and highly transparent media are reliably detected. The ultrasonic demonstrate their superiority over optical sensors here. Particularly with foils, metals and materials with similar properties, optical sensors are often pushed to their limits. Here, ultrasonic sensors supply reliable measurement values again without a problem, thereby reducing system downtimes. Diameter detection with ultrasonic sensors is frequently used in the metalworking industry as well as in the textile, paper and plastics industries and packaging machines.

5 *Sag and tear monitoring*

Ultrasonic sensors can be used not only to detect the roll thickness, they are also ideally suited for monitoring the sag and for identifying tears in the roll. Reliable monitoring with ultrasound thereby prevents more serious damage to the material and the device.



TECHNICAL DATA

	<i>U*18S</i>	<i>U*18</i>	<i>U*30</i>	<i>UDA18 ATEX</i>	<i>2UF Off-Highway</i>	<i>2U Industry</i>
Measurement range	40...300 mm 80...1200 mm	100 ... 900 mm 200 ... 2200 mm	250...3500 mm 350...6000 mm* 600...8000 mm*	100 ... 900 mm 200 ... 2200 mm	85...1800 mm**	80...925mm**
Operating modes	Retro-reflective sensor Diffuse reflection sensor	Retro-reflective sensor Diffuse reflection sensor	Retro-reflective sensor Diffuse reflection sensor	Diffuse reflection sensor	Diffuse reflection sensor	Diffuse reflection sensor
Outputs	Push-Pull/ IO-Link NPN/PNP 4 ... 20 mA 0 ... 10 V	Push-Pull/ IO-Link NPN/PNP 4 ... 20 mA 0 ... 10 V	Push-Pull/ IO-Link NPN/PNP 4 ... 20 mA 0 ... 10 V	NPN/PNP 4 ... 20 mA 0 ... 10 V	4 ... 20 mA 0,5...4,5 V	4...20mA 0.5...4.5V 0...10V Low-side / High-side
Operating voltage	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	8...36 V DC	8...36 V DC
Adjustment option	Programming cable IO-Link	Teach-in button IO-Link	Teach-in button IO-Link	Teach-in button	-	Teach-in button with display
Operating temperature	-20 ... +70 °C	-20 ... +70 °C	-20 ... +70 °C	-20...+50 °C	-40...+105 °C	-20...+70°C
Housing material	DIN 1.4404 or PBT	DIN 1.4404 or PBT	DIN 1.4404 or PBT	DIN 1.4404 or PBT	PA12	PA6/PBT
Dimensions	M18x1 L = 60.3 mm	M18x1 L = 91.6 mm	M30x1,5 L = 98.9 mm	M18x1 L = 91.6 mm	4-hole flange Division: 4 x 90° Bolt circle: 65 mm Head height: 33.4 mm	NPT/G1,5" NPT/G2" Width across flats: SW76 Head height: 40 mm
Connection type	M12 4-pin connector	M12 5-pin connector	M12 5-pin connector	M12 5-pin connector	1.5 3-pole AMP Superseal	M12 8-pin connector
Protection class	IP67	IP67	IP67	IP67	IP67	IP67
Approvals	CE cULus	CE cULus	CE cULus	CE cULus ATEX	CE	CE
ATEX	-	-	-	Gas (EX) version: II 3G Ex nA IIC T6 Gc (Zone 2) Dust (EX) version: II 3D Ex tc IIIB T60 °C Dc (Zone 22)	-	-
IO-Link	Yes	Yes	Yes	-	-	-
Synchronisation	-	Yes	Yes	Yes	-	-
Multiplex operation	-	Yes	Yes	Yes	-	-
Temperature compensation	Yes	Yes	Yes	Yes	Yes	Yes
Optional	-	-	-	-	Focus tube	-
Accessories	Sound deflection 90° Installation adapter	Sound deflection 90° Installation adapter	Installation adapter	Sound deflection 90° Installation adapter	Adapter set for 4-hole flange to 2" thread elo2UF TeachBox Adjustment of mea- surement range (on request)	-

* only with the plastic version / ** dependent on temperature range, installation position and focus tube



elobau

The company

As an expanding, globally active foundation company with more than 800 employees, we develop and manufacture sensor technology and operator interface controls for the industrial machine and off highway vehicle sectors. Our high-quality products are characterised by a high vertical range of manufacture and are manufactured in a carbon-neutral manner in Germany. With our innovative, non-contact sensor products, we support our customers worldwide in manufacturing industrial machines and vehicles that set standards in terms of performance, operator comfort, safety and quality.

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