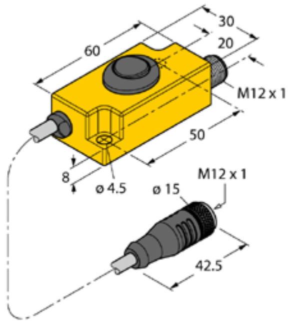
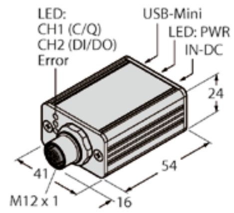
Accessories

TX1-Q20L60



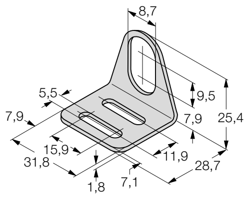
Teach adapter for inductive encoders, linear position, angle, ultrasonic and capacitive sensors

USB-2-IOL-0002



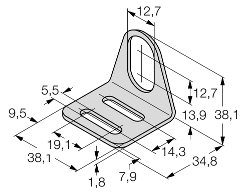
IO-Link Master with integrated USB port

MW-08



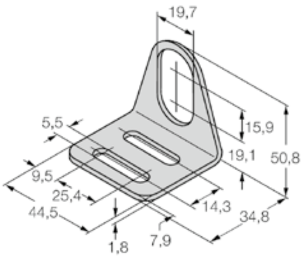
Mounting bracket for threaded barrel sensors, M8 x 1; material: Stainless steel A2 1.4301 (AISI 304)

MW-12



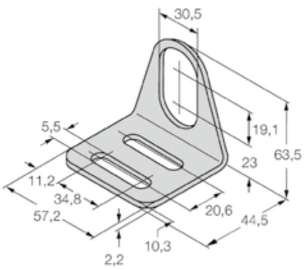
Mounting bracket for threaded barrel sensors, M12 x 1; material: Stainless steel A2 1.4301 (AISI 304)

MW-18



Mounting bracket for threaded barrel devices; material: Stainless steel A2 1.4301 (AISI 304)

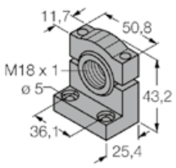
MW-30



Mounting bracket for threaded barrel devices; material: Stainless steel A2 1.4301 (AISI 304)

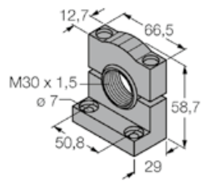
SMB18SF

Mounting bracket, PBT black, for sensors with 18 mm thread, rotatable

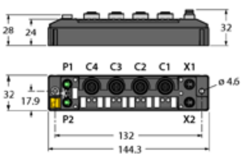


SMB30SC

Mounting bracket, PBT black, for sensors with 30 mm thread, rotatable

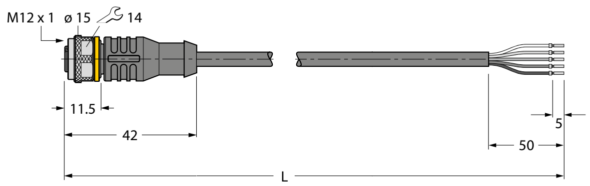
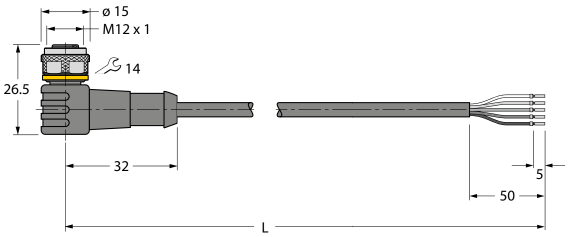
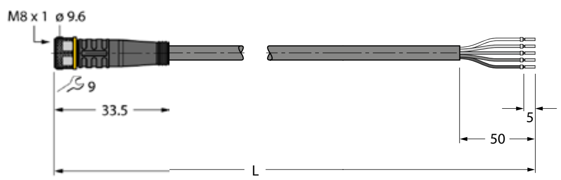
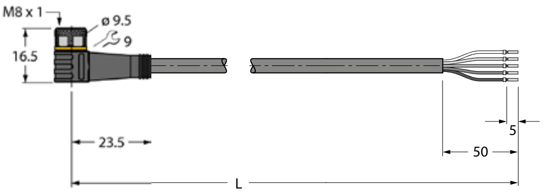


TBEN-S2-4IOL



Compact multiprotocol I/O module, 4 IO-Link Master 1.1 Class A, 4 universal PNP digital channels 0.5 A

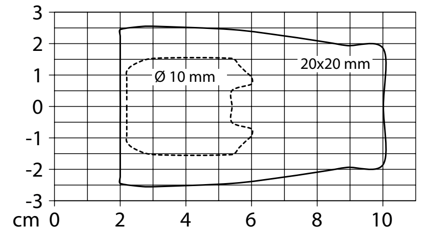
Connection Cable

Dimension drawing	Type code	Ident-No.	Description
	RKC4.5T-2/TEL	6625016	M12 female, straight, 5-pin, cable length: 2 m
	RKC4.5T-5/TEL	6625017	M12 female, straight, 5-pin, cable length: 5 m
	RKC4.5T-10/TEL	6625018	M12 female, straight, 5-pin, cable length: 10 m
	WKC4.5T-2/TEL	6625028	M12 female, angled, 5-pin, cable length: 2 m
	WKC4.5T-5/TEL	6625029	M12 female, angled, 5-pin, cable length: 5 m
	WKC4.5T-10/TEL	6625030	M12 female, angled, 5-pin, cable length: 10 m
	PKG4M-2/TEL	6625061	M8 female, straight, 4-pin, cable length: 2 m
	PKG4M-5/TEL	6625062	M8 female, straight, 4-pin, cable length: 5 m
	PKG4M-10/TEL	6625063	M8 female, straight, 4-pin, cable length: 10 m
	PKW4M-2/TEL	6625067	M8 female, angled, 4-pin, cable length: 2 m
	PKW4M-5/TEL	6625068	M8 female, angled, 4-pin, cable length: 5 m
	PKW4M-10/TEL	6625069	M8 female, angled, 4-pin, cable length 10 m

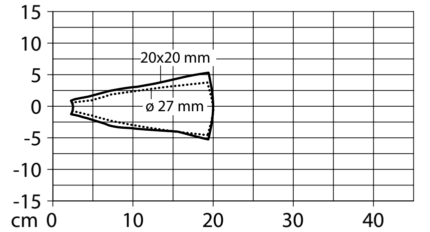
Performance Curves

The diagrams show the detection ranges of the individual ultrasonic sensors, covering reaches of 40 to 600 cm. There are different targets used in sizes 20 x 20 mm, 100 x 100 mm according to the EN standard 60947-5-2, as well as a round rod with a diameter of 27 mm in order to compare the detection ranges of different ultrasonic sensors. When using other targets than the aforementioned standard ones, the detection ranges may vary due to different reflection properties and geometries.

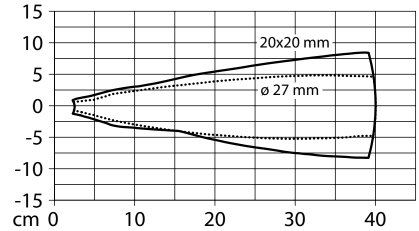
RU10 (M8)



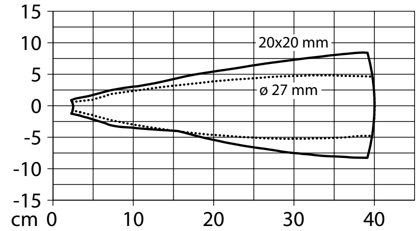
RU20 (M12)



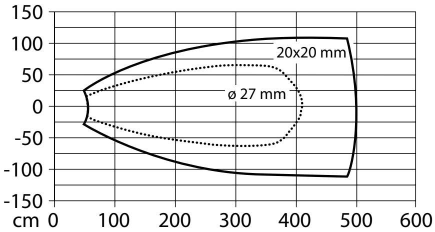
RU40 (M12)



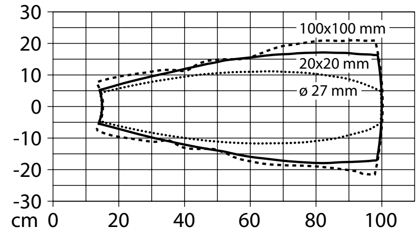
RU40 (M18)



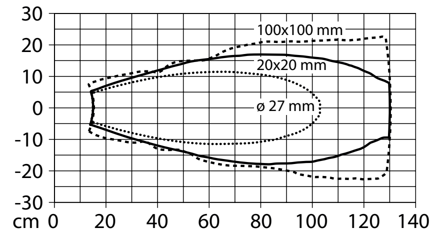
RU50



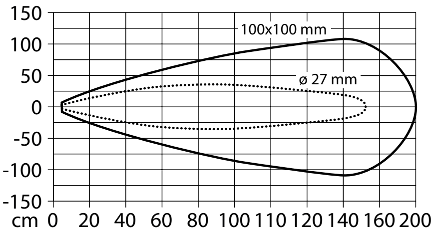
RU100



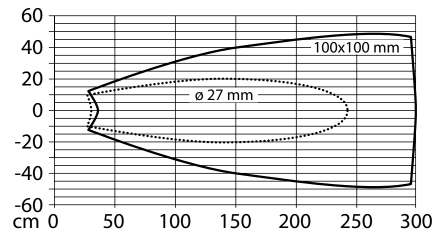
RU130



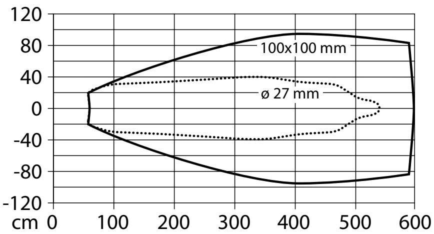
RU200



RU300



RU600



Glossar

What you always wanted to know – Basic information on ultrasonic sensors

Ultrasonic sensors are designed for the contactless and wear-free detection of a variety of targets by means of sound waves. A smooth and firm surface is required for the sound waves in order to ensure optimum reflectivity. Environmental conditions such as spray, dust or rain hardly affect the functioning of the sensors. Coarse material, furs or foam present a challenge since these mainly absorb the sound waves. Target surfaces with a surface variation of more than 0.15 mm have the advantage that the surface does not have to be aligned to the sensor so precisely. However, this does reduce the possible sensing range. The colour of the target has no influence on the switching distance, and transparent targets such as glass or plexiglass can also be detected reliably. However, the temperature of the target does influence the sensing range: Hot surfaces do not reflect sound waves as well as cold surfaces. Liquid surfaces reflect the sound waves in the same way as targets that are solid and smooth. However, the correct alignment should be ensured. Fabrics, foams, wool etc. absorb sound waves so this reduces the sensing range.

Sensing modes
Ultrasonic sensors are primarily used in diffuse mode. The distance to the target is calculated on the basis of the echo time and the known speed of sound in air. A target located in front of the sensor reflects part of the sound wave emitted and is thus detected in the same way on the surface of the sonic transducer. To do this, the sensor constantly alternates between emitter and receive mode. The settling time required by the surface of the sensor transducer to reach the basic state for reception determines the so-called blind zone. Within this zone, located directly in front of the sonic transducer surface, the echo time to the target cannot be measured (Fig. 1). This area must therefore be kept clear at all times. Opposed mode and reflective mode barriers can also be operated using ultrasonic waves. An opposed mode ultrasonic sensor consists of an emitter and a receiver that are constantly "listening" to each other. If there is a sufficiently large target between them, even within the blind zone, the sound is interrupted and the sensor generates a switching signal.

Sensing ranges and sonic angles
The range of ultrasonic sensors depends on the wave lengths and frequencies used. The signal range increases the longer the wave length and the smaller the frequency. For example, compact sensors are able to detect ranges from of 300-500 mm with wave lengths in the millimetre range. Longer wave lengths of 5 mm are suitable for detection ranges up to 8 m. Many sensors have a very narrow sonic angle of around 6 ° and are therefore particularly suitable for the precise detection of relatively small targets. Other sensors with sonic angles of 12-15 ° are also able to detect targets with large tilt angles. Some ultrasonic sensors are also available with an external sonic transducer. This is contained in a separate compact housing, whilst the electronics are located in the regular sensor housing. This separation is especially advantageous when mounting space is limited.

Adjustments
With almost all ultrasonic sensors it is possible to adjust the lower and the upper limit of the switching or measuring range with a potentiometer, by pressing a button or by means of a control line. Targets outside of the set range may be detected, but they don't initiate the output to change state. Several different parameters can often be adjusted, such as the sensor's response time, its response to a loss of echo, or if a pump is operated directly at the sensor. Programming devices can also be used with some ultrasonic sensors to adjust a host of other variables such as hysteresis or sensitivity, in addition to switching and measuring range limits. For example, by changing the averaging function

Synchronization
In most cases, sensor synchronisation will prevent mutual interference. Most sensors are capable of self-synchronisation by simply connecting the synchronisation line. Synchronised sensors emit sonic pulses simultaneously. When mounted correctly, they function like a single sensor with an extended detection angle. A well-known example of this are the ultrasonic parking sensors on modern automobiles.

Alternate sensor operation (multiplexing)
Alternately operating ultrasonic sensors function as fully independent units that are unable to influence each other. The more sensors are operated alternately, the lower the switching frequency. An enable input can also often be used for multiplexing. The sensor is enabled when the enable input is connected to +24 V and disabled when the input is connected to 0V. Multiplexing via this input has the advantage that for each enable-operation only the response time has to be considered and not also the time-delay before availability. Most sensors can be programmed with a programming device so that they can multiplex automatically by connecting the synchronisation lines.