RU40U-M12-AP6X2-H1141
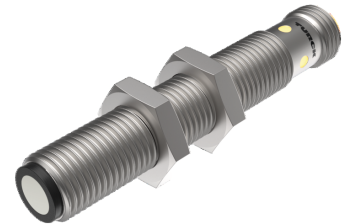# Ultrasonic Sensor – Diffuse Mode Sensor
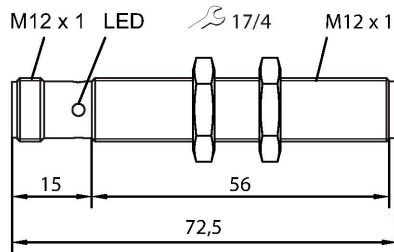
Technical data

| Type	RU40U-M12-AP6X2-H1141
ID	100000279
Ultrasonic data	
Function	Proximity
Range	40…400 mm
Resolution	0.5 mm
Minimum switching range	3 mm
Ultrasound frequency	300 kHz
Repeat accuracy	≤ 0.15 % of full scale
Linearity error	≤ ± 0.5 %
Edge lengths of the nominal actuator	20 mm
Approach speed	≤ 5 m/s
Pass speed	≤ 2.9 m/s
Electrical data	
Operating voltage U_B	10…30 VDC
Residual ripple	10 % U_{ss}
DC rated operating current I_e	≤ 150 mA
No-load current	≤ 50 mA
Residual current	≤ 0.1 mA
Response time typical	< 60 ms
Readiness delay	≤ 300 ms
Communication protocol	IO-Link
Output function	NO/NC, PNP

Features

- Smooth sonic transducer face
- Cylindrical housing M12, potted
- Connection via M12 × 1 male connector
- Teach range adjustable via connection cable
- Blind zone: 4 cm
- Range: 40 cm
- Resolution: 0.5 mm
- Aperture angle of sonic cone: ±15 °
- Switching output, PNP, programmable via IO-Link
- NO/NC programmable
- IO-Link

Wiring diagram
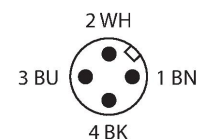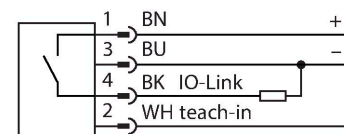
Functional principle

Ultrasonic sensors capture a multitude of objects contactlessly and wear-free with ultrasonic waves. It does not matter whether the object is transparent or opaque, metallic

Technical data

|	
Switching frequency	≤ 10.4 Hz
Hysteresis	≤ 5 mm
Voltage drop at I_e	≤ 2.5 V
Short-circuit protection	yes/Cyclic
Reverse polarity protection	yes
Wire breakage protection	yes
Setting option	Remote Teach IO-Link
IO-Link	
IO-Link specification	V 1.1
IO-Link port type	Class A
Communication mode	COM 2 (38.4 kBaud)
Process data width	16 bit
Measured value information	15 bit
Switchpoint information	1 bit
Frame type	2.2
Minimum cycle time	2 ms
Function pin 4	IO-Link
Function Pin 2	DI
Maximum cable length	20 m
Profile support	Smart Sensor Profile
Included in the SIDI GSDML	Yes
Mechanical data	
Design	Threaded barrel, M12
Radiation direction	straight
Dimensions	Ø 12 x 72.5 mm
Housing material	Metal, CuZn, Chrome-plated
Max. tightening torque of housing nut	20 Nm
Transducer material	Plastic, Epoxyd resin and PU foam
Electrical connection	Connector, M12 × 1, 4-wire
Ambient temperature	-10…+60 °C
Storage temperature	-40…+80 °C
Pressure resistance	0.5…5 bar
Protection class	IP67
Switching state	LED, Yellow
Object detected	LED, Green
Tests/approvals	
MTTF	377 years acc. to SN 29500 (Ed. 99) 40 °C

or non-metallic, firm, liquid or powdery. Even environmental conditions such as spray, dust or rain hardly affect their function.
The sonic cone diagram indicates the detection range of the sensor. In accordance with standard EN 60947-5-2, quadratic targets in a range of sizes (20 × 20 mm, 100 × 100 mm) and a round rod with a diameter of 27 mm are used.
Important: The detection ranges for other targets may differ from those for standard targets due to the different reflection properties and geometries.
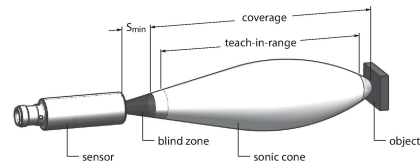
Sonic Cone
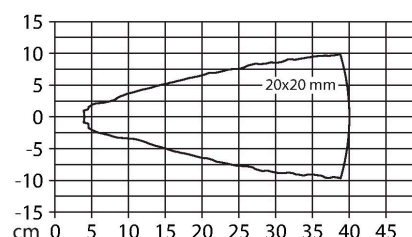
Technical data

Declaration of conformity EN ISO/IEC	EN 60947-5-2
Vibration resistance	20 g, 10…55 Hz, sine, 3 axes, 30 min/axis according to IEC 60068-2-6
Shock test	30 g, 11 ms, half sine, 3 axes according to IEC 60068-2-27
Approvals	CE cULus

Mounting instructions

Mounting instructions/Description

Setting the switchpoint
The ultrasonic sensor features a switching output with a teachable switching point. The green and yellow LEDs indicate whether the sensor has detected the object.

A switching point or a switching window is taught in. This must be within the detection range. In this operating mode the background is suppressed.

Teach
• Position the object at the beginning of the protection area
• Short-circuit pin 2 (WH) against Ub for 2–7 seconds to teach in an individual switching point or the beginning of the switching window
•Place object at the end of the switching range
• Short-circuit pin 2 (WH) against Ub for 8–11 seconds to teach in the end of the switching window
After a successful teach-in, the yellow LED flashes at 2 Hz and the sensor runs automatically in normal mode.
Optional: Short-circuit pin 2 (WH) against Ub for 12–17 seconds to switch between NC and NO function (no object required)
• Return to normal operating mode after 17 s or more.

LED response
In standard operating mode, the two LEDs indicate the switching state of the sensor.
• Green: Object within the detection range but not in switching range
• Yellow: Object is within the switching range
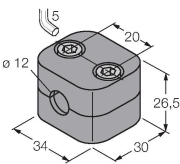• Off: Object is outside the detection range or signal loss

Accessories
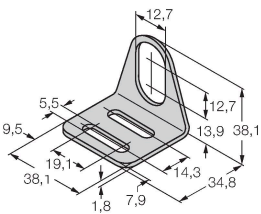
MW12	6945003
	Mounting bracket for threaded barrel sensors; material: Stainless steel A2 1.4301 (AISI 304)

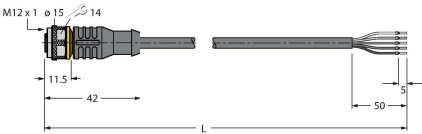| BSS-12	6901321
	Mounting clamp for smooth and threaded barrel sensors; material: Polypropylene

Wiring accessories

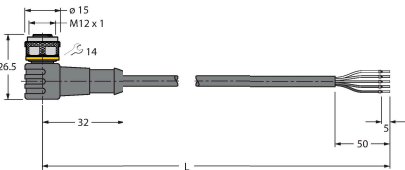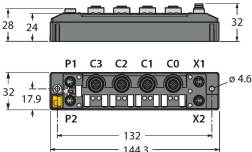| Dimension drawing	Type	ID	
	RKC4.5T-2/TEL	6625016	Connection cable, M12 female connector, straight, 5-pin, cable length: 2 m, jacket material: PVC, black; cULus approval
	WKC4.5T-2/TEL	6625028	Connection cable, M12 female connector, angled, 5-pin, cable length: 2 m, jacket material: PVC, black; cULus approval

Accessories

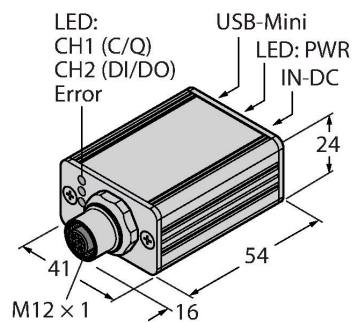| Dimension drawing	Type	ID	
	TBEN-S2-4IOL	6814024	Compact multiprotocol I/O module, 4 IO-Link Master 1.1 Class A, 4 universal PNP digital channels 0.5 A

Dimension drawing	Type	ID	
	USB-2-IOL-0002	6825482	IO-Link Master with integrated USB port

LED:
CH1 (C/Q)
CH2 (DI/DO)
Error

USB-Mini
LED: PWR
IN-DC

24

54

41

M12 × 1

16

	VB2-SP1	A3501-29	Teach adapter

ø 4.5 [0.18]
ø 8 [0.31]
23 [0.91]
0.2 m
38 [1.50]
39.3 [1.55]
M12 x 1
P1
25 [0.98]
18 [0.71]
42.5 [1.67]
J1
12.7 [0.50]
13 [0.51]
ø 5.1 [0.20]
M12 x 1
ø 14.5 [0.57]
20 [0.79]