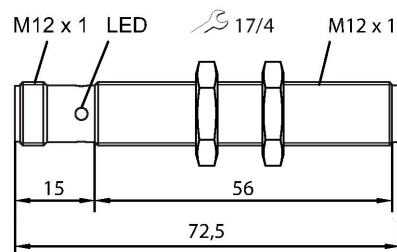


# RU20U-M12-AP6X2-H1141

## Ultrasonic Sensor – Diffuse Mode Sensor



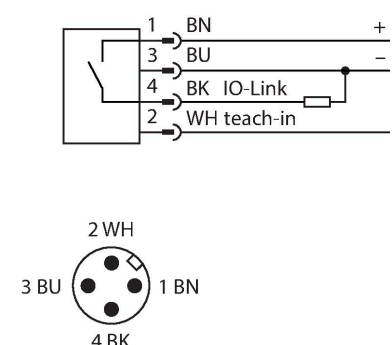
### Technical data

Type	RU20U-M12-AP6X2-H1141
ID	100000278
<b>Ultrasonic data</b>	
Function	Proximity switch
Range	25...200 mm
Resolution	0.5 mm
Minimum switching range	3 mm
Ultrasound frequency	400 kHz
Repeat accuracy	≤ 0.15 % of full scale
Linearity error	≤ ± 0.5 %
Edge lengths of the nominal actuator	10 mm
Approach speed	≤ 3 m/s
Pass speed	≤ 1.1 m/s
<b>Electrical data</b>	
Operating voltage	10...30 VDC
Residual ripple	10 % U <sub>ss</sub>
DC rated operational current	≤ 150 mA
No-load current	≤ 50 mA
Residual current	≤ 0.1 mA
Response time typical	< 50 ms
Readiness delay	≤ 300 ms
Communication protocol	IO-Link
Output function	NO/NC, PNP
Switching frequency	≤ 12.5 Hz
Hysteresis	≤ 3 mm
Voltage drop at I <sub>o</sub>	≤ 2.5 V
Short-circuit protection	yes / Cyclic

### Features

- Smooth sonic transducer face
- Cylindrical housing M12, potted
- Connection via M12 × 1 male connector
- Teach range adjustable via connection cable
- Blind zone: 2.5 cm
- Range: 20 cm
- Resolution: 0.5 mm
- Aperture angle of sonic cone: ±9 °
- 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 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

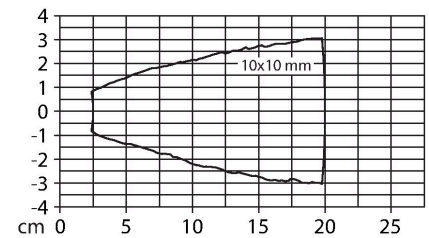
## Technical data

Reverse polarity protection	yes
Wire breakage protection	yes
Setting option	Remote Teach IO-Link
<b>IO-Link</b>	
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
<b>Mechanical data</b>	
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
<b>Tests/approvals</b>	
MTTF	377 years acc. to SN 29500 (Ed. 99) 40 °C
Declaration of conformity EN ISO/IEC	EN 60947-5-2
Vibration resistance	IEC 60068-2
Approvals	CE cULus

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.

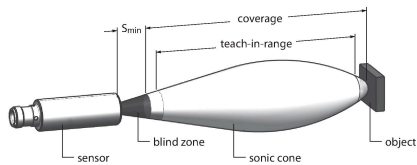
Important: The detection ranges for other targets may differ from those for standard targets due to the different reflection properties and geometries.

## Sonic Cone



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

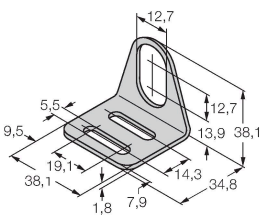
After a successful teach-in, the yellow LED flashes at 2 Hz and the sensor runs automatically in normal mode.  
Optional: Short-circuit pin 2 (WH) against Ub for 12–17 seconds to switch between NC and NO function (no object required)  
• Return to normal operating mode after 17 s or more.

**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

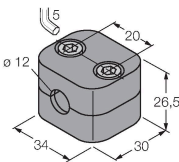
Accessories

MW-12 6945003



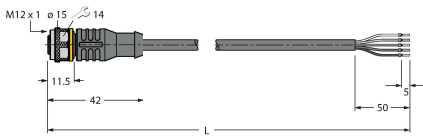
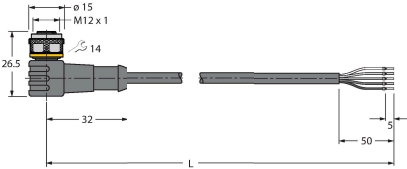
Mounting bracket for threaded barrel sensors; material: Stainless steel A2 1.4301 (AISI 304)

BSS-12 6901321



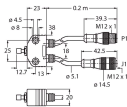


Mounting clamp for smooth and threaded barrel sensors; material: Polypropylene

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
	USB-2-IOL-0002	6825482	IO-Link Master with integrated USB port
	VB2-SP1	A3501-29	Teach adapter