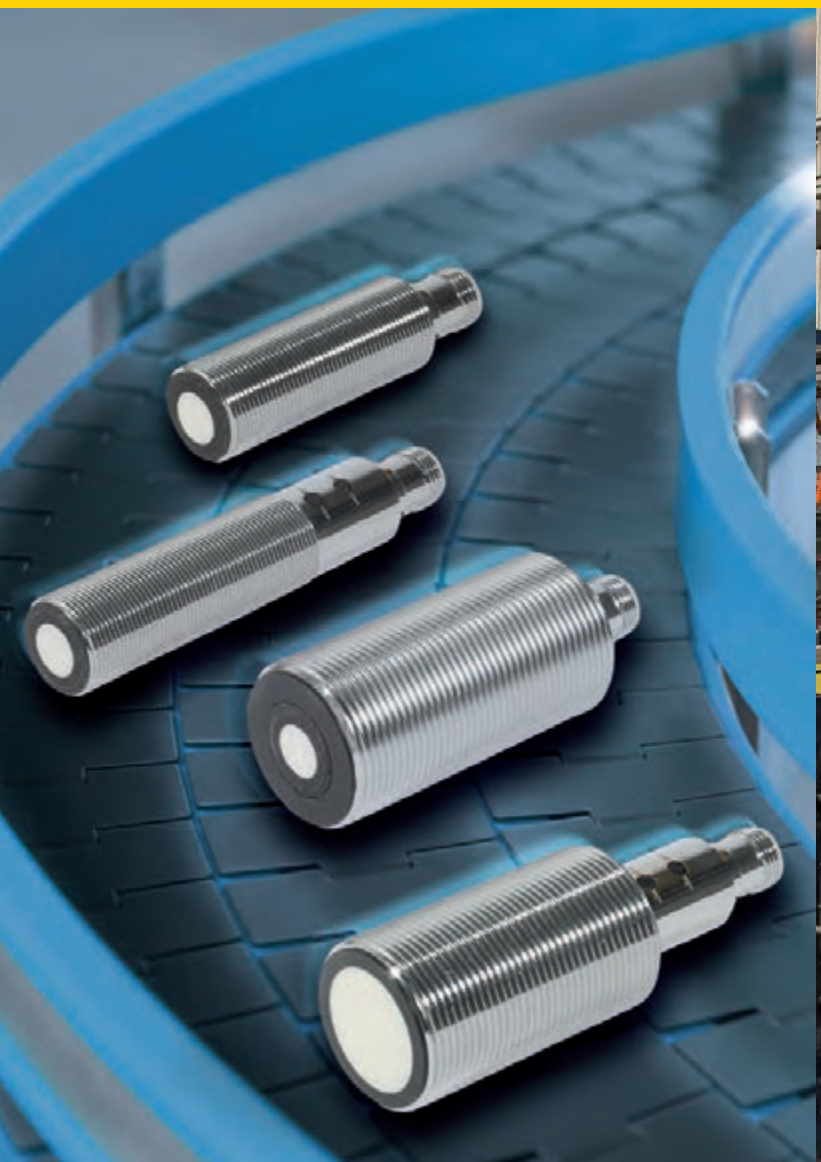
Your Global Automation Partner

TURCK

Ultrasonic Sensors



At TURCK, we understand that not every application is the same. That's why we dedicate ourselves to finding the optimal engineered solution for every application; not just the standard ones.

Listening to customers and developing solutions are part of what makes TURCK fast, flexible and easy to do business with.

Whether you need a single product or a full suite of innovative automation solutions our experience allows us to tap into an extensive amount of engineering knowledge and solve customer problems others can't. Additionally, TURCK uses the most up to date manufacturing processes and quality materials so our products not only survive, but thrive in even the harshest applications.

That's the TURCK advantage.

85,000+
SOLUTIONS

50+
YEARS OF EXPERIENCE

2000+
EXPERIENCED SALES REPRESENTATIVES

Pioneer in non-contact
sensing technology

Developed innovative connectivity solutions in response to our sensor customer needs

Recognized need and advanced knowledge of harsh duty environments lead to I/O solutions

SUPPORT & DEDICATED SERVICE

LIFETIME WARRANTY

3,500+
APPLICATION ENGINEERS

RESPOND & SOLVE over **1,200** inquiries per day

Strategically placed manufacturing facilities
in the USA with **27** GLOBAL SUBSIDIARIES

with PARTNERS in **60** FURTHER **COUNTRIES**

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Ultrasonic Sensors

The new RU-U sensor series from TURCK is a smart and streamlined selection of M18 and M30 devices with a great ultrasonic reach and the potential for effective inventory management. This is made possible thanks to the short blind zones that are effective even at long ranges.

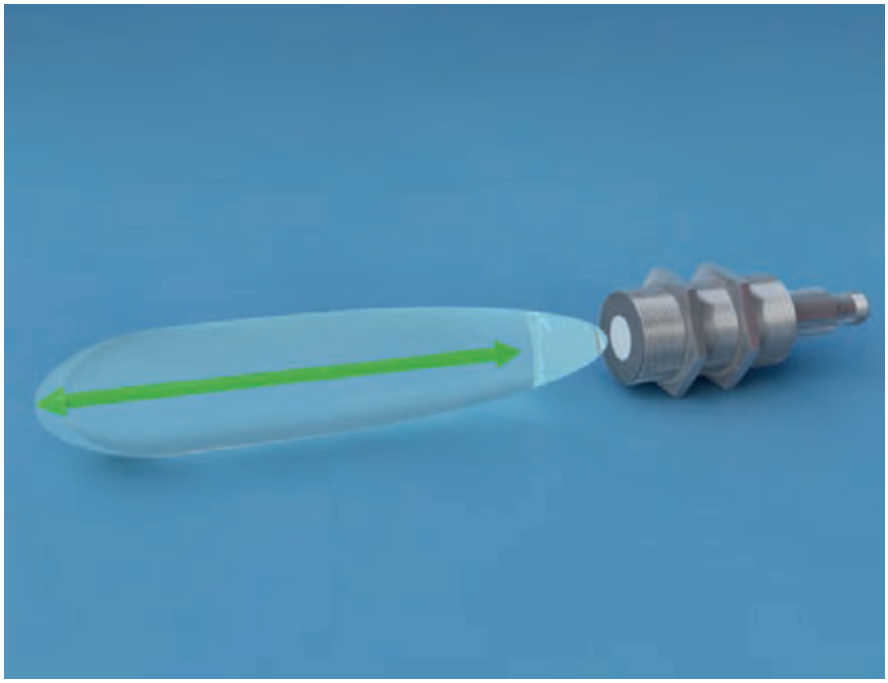
TURCK has expanded the versatility of this sensor series to meet all application demands: The standard versions allow you to set a window and two separate switchpoints, either by teach adapter or via teach buttons directly on the sensor.

You can use the high-end variant as a switch and also as an analog sensor. Via IO-Link, you can adjust different operating modes, the temperature compensation and the output function. If you install several sensors side-by-side, you can run them in synchronized mode or multiplex them to prevent crosstalk.

The Functional Principle

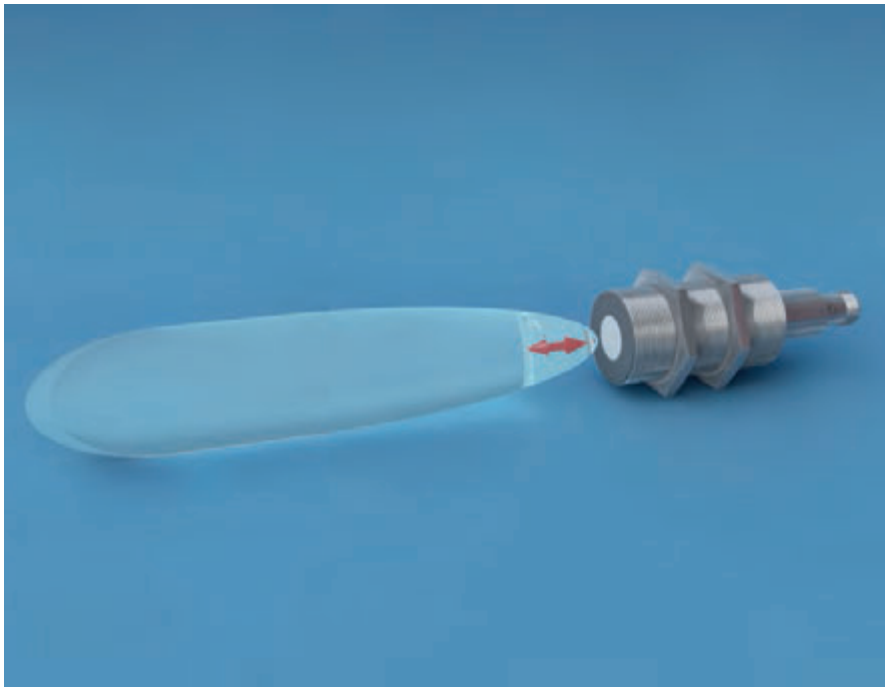
The principle that applies here is the transit time method and works as follows: The sensor emits a sonic pulse and measures the time the reflected signal needs to return to the transducer. The distance to the object is calculated from the known speed of sound in the air and is either output as a measured value or as a switching signal. Since the speed of sound depends on the air temperature, the sensor measures the temperature separately to compensate the transit-time difference at different temperatures.

In general, the ultrasonic technology holds a very important position in the broad field of industrial sensor systems. With its large coverage, this technology is on equal terms with inductive, capacitive and optical sensing methods. However, this measuring principle is special, because it is not an electromagnetic but a mechanical mode of operation and thus requires some additional knowledge about the application.



Large Coverage

Thanks to the newly developed transducers, this sensor series covers large distances. The M18 up to 1.30 m and the M30 up to 3 m. The latter does not even need a bigger transducer head. This provides more flexibility for application.



Short Blind Zone

The devices are backwards compatible thanks to the extremely short blind zone. The M18 version for example, has a blind zone of 25 mm and covers a range of 40 cm. Objects that are close to the sensor are still detected reliably and the mounting depths such as in level control applications for example can be adjusted better. Since the blind zone must be kept free in order to avoid false signals, a short blind zone provides better opportunities for assembly and effective object detection.

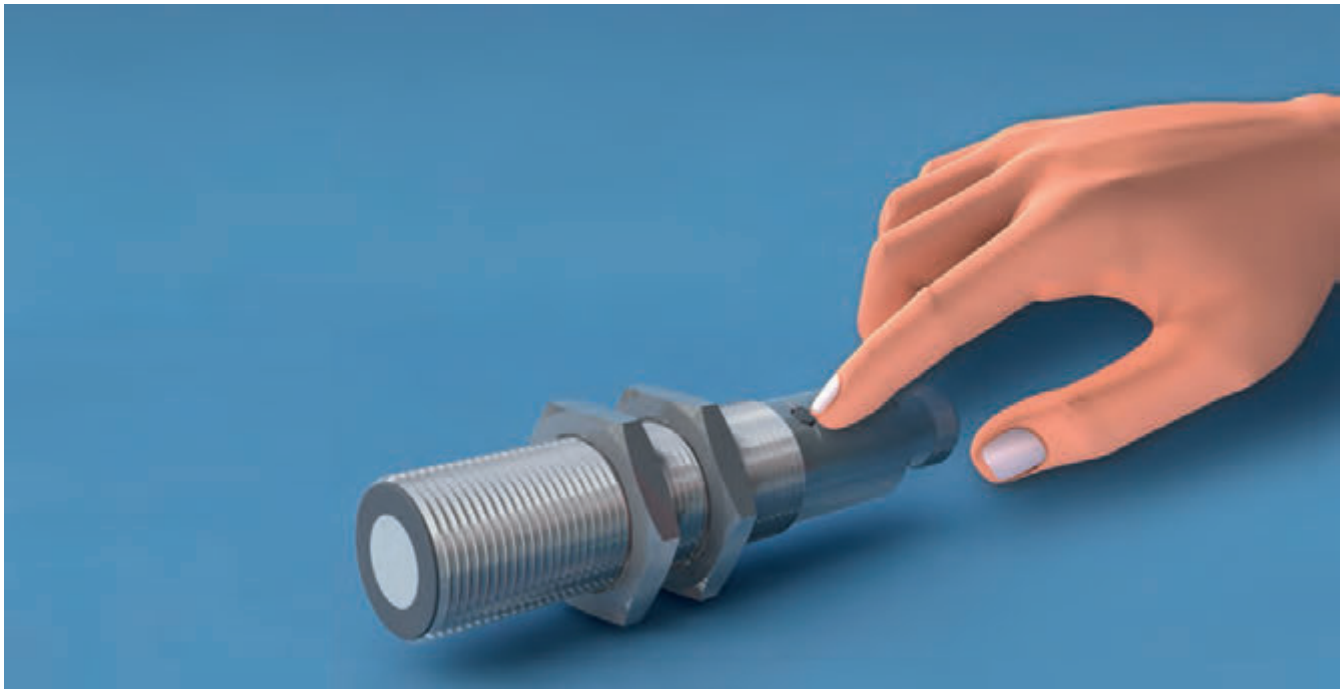
Features

Rugged Construction

The rugged full-metal barrel is extremely short and forms with the metal M12 connector. Potential material weaknesses that may result in damage to the unit when installed in harsh environments and exposed to low temperatures are thus eliminated. The sensor is fully threaded and can be screwed in the desired position.

Front-Flush Transducer

The smooth transducer front prevents pollution and deposition of particles of any kind. In the ideal case, the mechanical motion of the transducer even shakes off deposits, making it self-cleaning. You can also simply wipe off particles that stick on the surface at higher humidity, thus keeping the area between transducer surface and ring clean. Damage caused by sharp or pointed cleaning tools belong to the past.



Easy-Teach

For simple and intuitive adjustment, all ultrasonic M18 and M30 sensors are equipped with a teach-in on pin 5, allowing you to focus the device easily and accurately on the target. You can set switch-points or measuring ranges comfortably this way without external software.

The settings are either made remotely via TURCK Easy-Teach or directly via buttons on the sensor that are embedded in the rugged metal housing. They must be made within a timeout period before the automatic locking sets in to protect against inadvertent operation. A reset of the sensor unlocks the buttons.

Features

IO-Link Interface

Besides the teach-in functionality, the high-end variants with switching and analog output can also be parametrized via the IO-Link interface version 1.1. You can set them to other operating modes, such as opposed mode sensing in order to use them as pure transmitters or receivers. Other adjustable features are timeout or temperature compensation. They are adjusted either via the internal temperature sensor or additionally via an external temperature sensor, thus allowing more accurate readings because the ambient temperature is also included in the measurement.

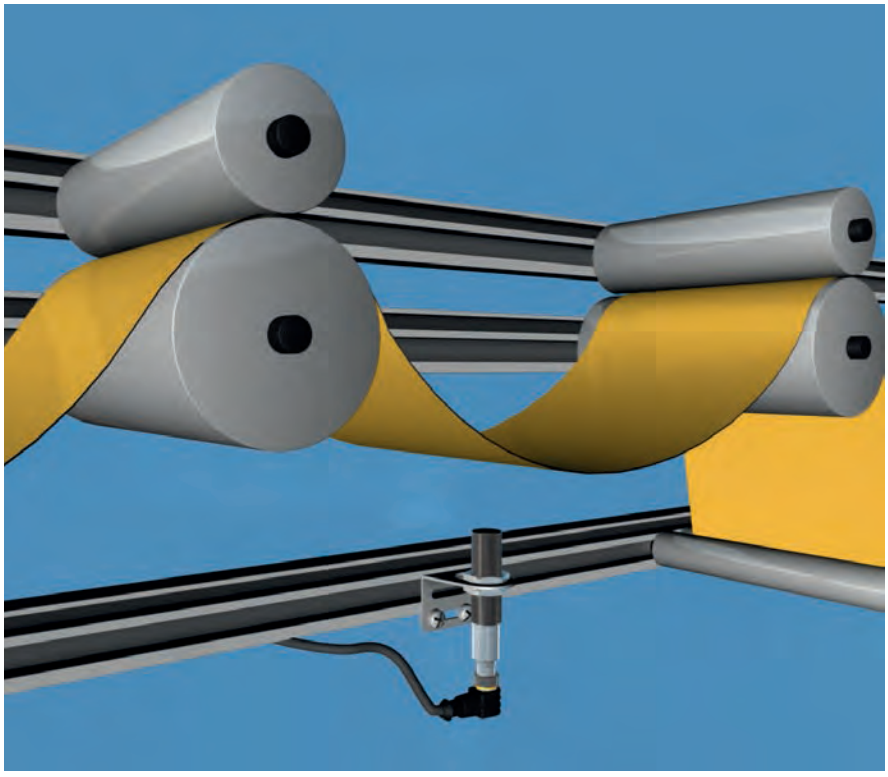
On devices with analog output you can adjust a rising or falling characteristic curve, whereas on those with switching output you can adjust the hysteresis. If instead of the switching and analog output, two independent switching outputs are required, these can be set to PNP or NPN and NC or NO function mode.

If multiple devices are installed in the same environment, it is possible to run them in synchronized mode or to multiplex them in order to prevent crosstalk. The 16-bit data width of the process value can be read out with 38,400 Baud via the supported COM2 communication type.

Application Examples

Conveyor Belt

The ultrasonic sensors are very suitable for harsh and dusty environments. They scan bulk material from above. For this, several sensors are mounted side-by-side to cover the entire width of the belt. Crosstalk is avoided by multiplexing, whereby each sensor has its own address. In this way the sensors work cyclically one at a time. A targeted control of each individual sensor is also possible. If the sensors are arranged with a larger clearance, they can also be run as a group in synchronized mode.



Web Control

Foil, paper and other roll material on motorized reels are usually controlled for sag. This is a typical task for ultrasonic sensors, because they ignore surface qualities such as color and also abrasion dust. Depending on the size of the sag, sensing ranges of up to several meters are possible with accuracies in the millimeter range. When used as a limit switch, they can start and stop drives, and via the analog output they can also be used for speed control.

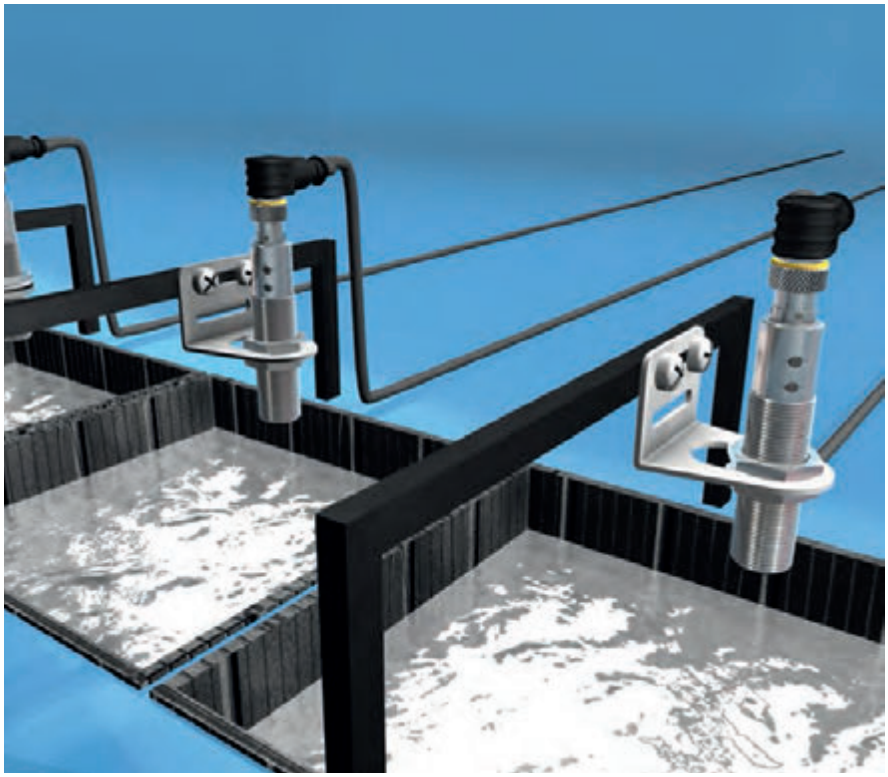
Application Examples

Clear Object Detection

Clear objects, which are difficult to detect by optical sensors, are no problem for ultrasonic devices. When properly aligned, they recognize a glass pane reliably even from a great distance. They are therefore ideal for final assembly processes such as the recognition of windscreens – and thanks to their color ignoring ability –they also capture seats, fittings, seals, or general interior. The ultrasonic technology also facilitates the function test of moving parts, such as the control of end positions of chairs or the drawing up of seats or car roofs.

Level Control

Liquids represent a very good reflector for ultrasonic waves, provided that they do not foam. Level control of fluid reservoirs is thus a perfect job for ultrasonic sensors. They are insensitive to spray and fluid drops. If suitably installed, the mechnical motion of the diaphragm even shakes off deposits and cleans itself. You can set multiple switching thresholds, use them for continuous measurement of filling levels or direct control of pumps. Thanks to the short blind zone, they can be installed near to the liquid's surface.



Variants

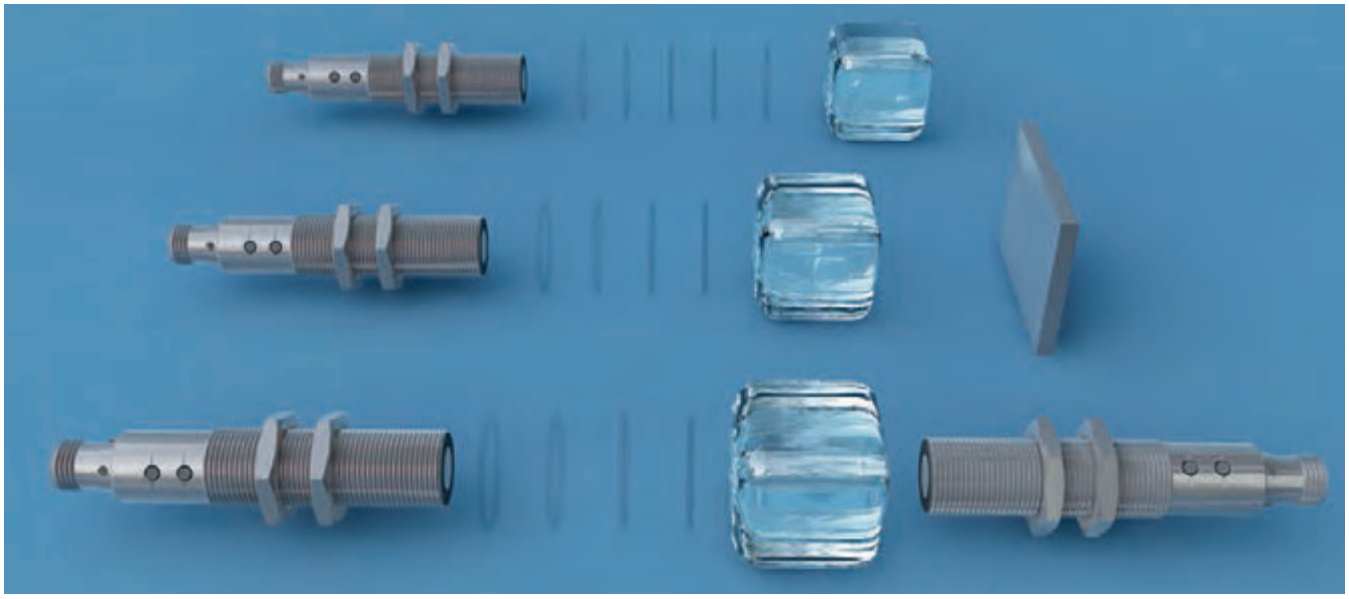
The new ultrasonic RU-U sensor series comprises compact, standard and high-end variants which replace the existing product portfolio of ultrasonic sensors.

Compact Series

With the compact types RU40 and RU100 that cover ranges of up to 40 cm and 100 cm, we have significantly reduced the number of different types, since the output function can now be switched directly via teach adapter or cable on Pin 5.

Standard Series

The standard variants are also adjustable via pin 5, depending on the model either via teach adapter or with teach buttons. Equipped with a dual-discrete output, they round off the product portfolio. You can adjust a switching window and the output function on them.



The high-end series can be adjusted to different operating modes, such as diffuse, retroreflective and also opposed mode.

Variants

High-End Series

Besides devices with teach buttons, we also offer the "high-end" switching/analog versions on which you can do various settings via IO-link and, if you wish, you can even use them as a dual-discrete switch. The long-range standard and high-end M30 variants round off the product portfolio.

Overview Ranges

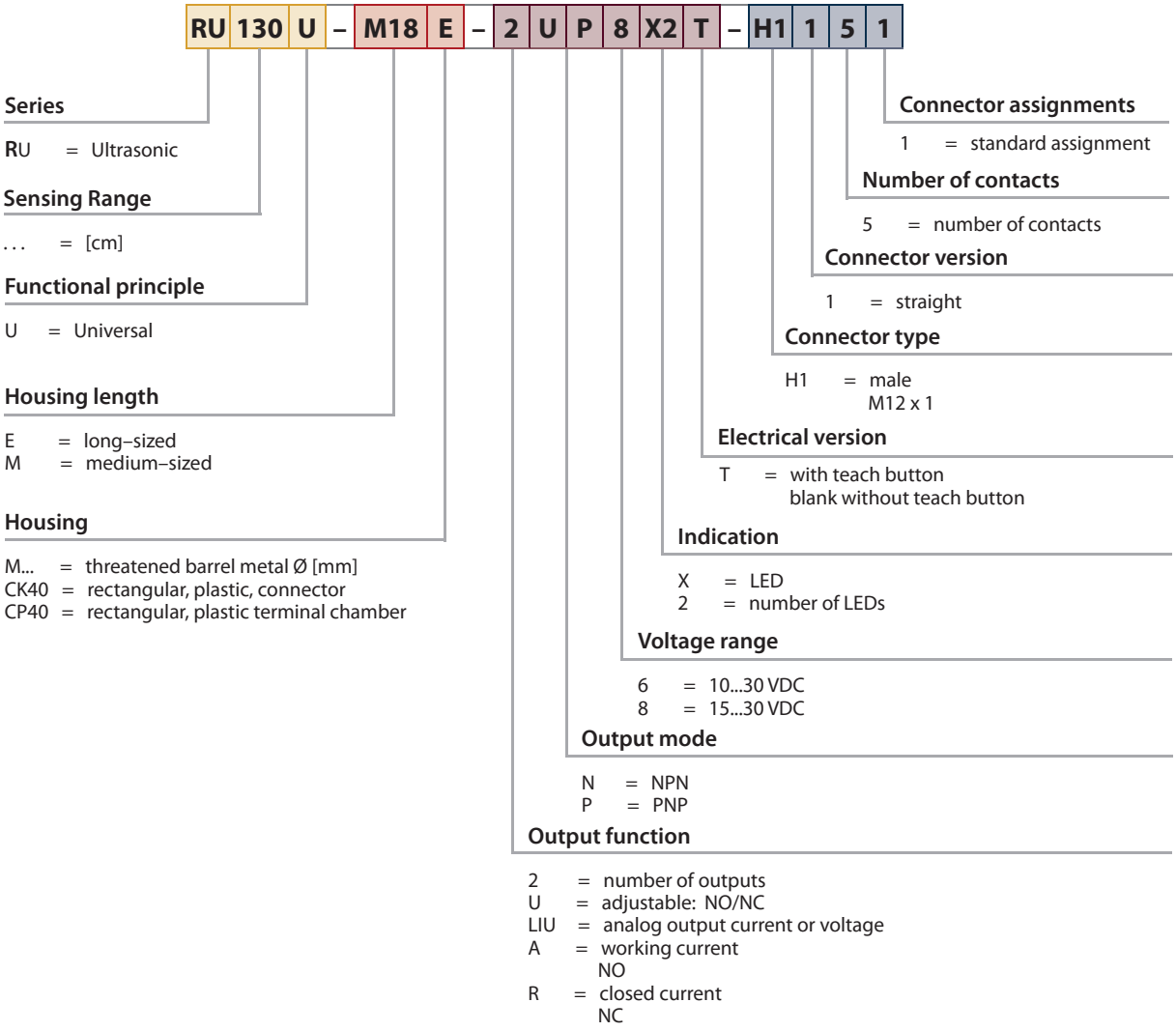
	M18			M30	
					
Compact 1 switching output	40 cm 100 cm				
Standard 2 switching outputs		40 cm 130 cm	40 cm 130 cm	40 cm 130 cm 300 cm	130 cm 300 cm
High-End 1 analog and 1 switching output			40 cm 130 cm		130 cm 300 cm

Product Features

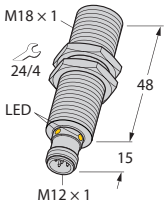
- Compact, rugged housing
- Many mounting possibilities
- Immune to electromagnetic interference fields
- Easy-Teach functionality to set switching windows and measuring ranges
- Voltage supply 15…30 VDC
- Versions with switching output, 2 x switching outputs or 1 switching and 1 analog output
- Analog output, 4…20 mA and 0…10 V
- Male M12 x 1; 5-pin

LED Display

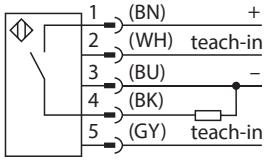
- **Green:** Object in the detection range
- **Yellow:** Object in the switching or measuring range
- **Off:** No object in the detection range



Technical Features – Compact

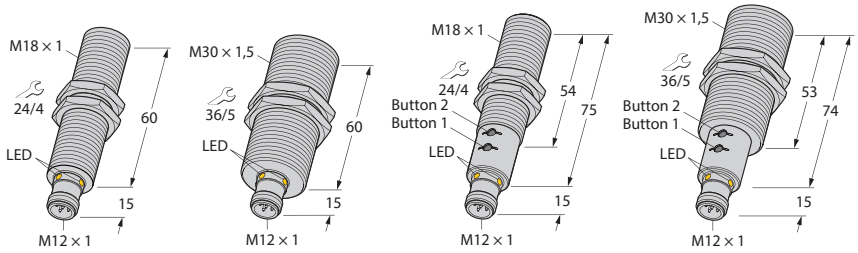


Wiring diagram

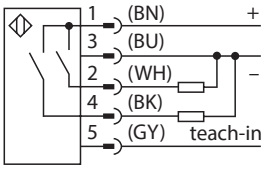


Technical features	RU40U-M18M -UP8X2-H1151	RU100U-M18M-UP8X2-H1151
Blind zone S_{min}	2.5 cm	15 cm
Operating distance	40 cm	100 cm
Cone angle	9 °	16 °
Ultrasonic frequency	300 kHz	200 kHz
Max. approach speed	4 m/s	8 m/s
Max. traverse speed	1.5 m/s	
Resolution	0.05 cm	0.1 cm
Repeatability	0.15 % of full scale	
Operating voltage	15…30 VDC	
Rated operational current	≤ 150 mA	
No-load current	≤ 50 mA	
Design	threaded barrel, CuZn, nickel-plated	
Protection class acc. to EN 60529	IP67	
Connection mode	male M12 x 1; 5-pin	
Resistance to vibration and mechanical shock	IEC 60068-2	
Operating temperature	-25…+70 °C	
Switching hysteresis	5 mm	10 mm
Switching frequency	7 Hz	8 Hz
Response time	75 ms	65 ms
Readiness delay	≤ 300 ms	
Approvals	CE, UL	

Technical Features – Standard

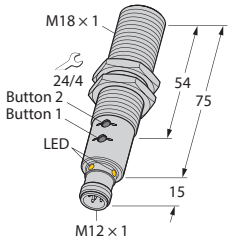


Wiring diagram

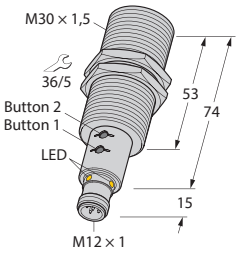


Technical features	RU40U-M18E-2UP8X2-H1151	RU40U-M18E-2UP8X2T-H1151	RU130U-M18E-2UP8X2-H1151	RU130U-M18E-2UP8X2T-H1151	RU40U-M30M-2UP8X2-H1151	RU130U-M30M-2UP8X2-H1151	RU130U-M30E-2UP8X2T-H1151	RU300U-M30M-2UP8X2-H1151	RU300U-M30E-2UP8X2T-H1151
Dimension drawing	A	C	A	C	B	B	D	B	D
Blind zone S_{min}	2.5 cm		15 cm		2.5 cm	15 cm		30 cm	
Operating distance	40 cm		130 cm		40 cm	130 cm		300 cm	
Cone angle	9°		16°		9°	16°		15°	
Ultrasonic frequency	300 kHz		200 kHz		300 kHz	200 KHz		120 kHz	
Max. approach speed	4 m/s		8 m/s		4 m/s	8 m/s		8 m/s	
Max. traverse speed	1.5 m/s								
Resolution	0.05 cm		0.1 cm		0.1 cm	0.1 cm		0.1 cm	
Repeatability	0.15 % of full scale								
Operating voltage	15…30 VDC								
Rated operational current	≤ 150 mA								
No-load current	≤ 50 mA								
Design/ Housing	threaded barrel, CuZn, nickel-plated								
Protection class acc. to EN 60529	IP67								
Connection mode	male M12 x 1; 5-pin								
Resistance to vibration and mechanical shock	IEC 60068-2								
Operating temperature	-25…+70 °C								
Switching hysteresis	5 mm	5 mm	10 mm	10 mm	5 mm	10 mm	10 mm	25 mm	25 mm
Switching frequency	7 Hz		8 Hz		7 Hz	8 Hz		4 Hz	
Response time	75 ms		65 ms		75 ms	65 ms		125 ms	
Readiness delay	≤ 300 ms								
Approvals	CE, UL								

Technical Features – High-End

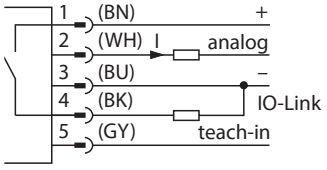


A



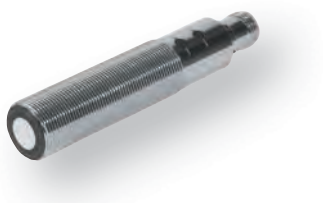
B

Wiring diagram



Technical features	RU40U-M18E-LIU2PN8X2T-H1151	RU130U-M18E-LIU2PN8X2T-H1151	RU130U-M30E-LIU2PN8X2T-H1151	RU300U-M30E-LIU2PN8X2T-H1151
Dimension drawing	A	B	A	B
Blind zone S_{min}	2.5 cm	15 cm	15 cm	30 cm
Operating distance	40 cm	130 cm	130 cm	300 cm
Cone angle	9 °	16 °	16°	15°
Ultrasonic frequency	300 kHz	200 kHz	200 kHz	120 kHz
Max. approach speed	4 m/s	8 m/s	8 m/s	8 m/s
Max. traverse speed	1.5 m/s			
Resolution	0.05 cm	0.1 cm	0.1 cm	0.1 cm
Repeatability	0.15 % of full scale			
Operating voltage	15…30 VDC			
Rated operational current	≤ 150 mA			
No-load current	≤ 50 mA			
Design/ Housing	threaded barrel, CuZn, nickel-plated			
Protection class acc. to EN 60529	IP67			
Connection mode	male M12 x 1; 5-pin			
Resistance to vibration and mechanical shock	IEC 60068-2			
Operating temperature	-25…+70 °C			
Switching hysteresis	5 mm	10 mm	10 mm	25 mm
Switching frequency	7 Hz	8 Hz	8 Hz	4 Hz
Response time	75 ms	65 ms	65 ms	125 ms
Readiness delay	≥ 300 ms			
Approvals	CE, UL			

Overview of Types



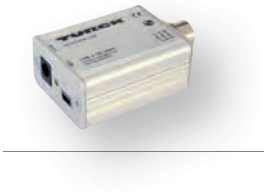
M18

Type code	Output function	Setting	Range	Connectivity
RU100U-M18M-UP8X2-H1151	switching output	teach cable	15…100 cm	M12 x 1, 5-pin
RU40U-M18M-UP8X2-H1151			2.5…40 cm	
RU130U-M18E-2UP8X2-H1151	2 switching outputs		15…130 cm	
RU40U-M18E-2UP8X2-H1151			2.5…40 cm	
RU130U-M18E-2UP8X2T-H1151		teach cable + teach buttons	15…130 cm	
RU40U-M18E-2UP8X2T-H1151			2.5…40 cm	
RU130U-M18E-LIU2PN8X2T-H1151	switching and analog output IO-Link	teach cable + teach buttons + IO-Link	15…130 cm	
RU40U-M18E-LIU2PN8X2T-H1151			2.5…40 cm	

M30

Type code	Output function	Settings	Range	Connectivity
RU40U-M30M-2UP8X2-H1151	2 switching outputs	teach cable	2.5…40 cm	M12 x 1, 5-pin
RU130U-M30M-2UP8X2-H1151			15…130 cm	
RU300U-M30M-2UP8X2-H1151			30…300 cm	
RU130U-M30E-2UP8X2T-H1151		teach cable + Teach buttons	15…130 cm	
RU300U-M30E-2UP8X2T-H1151			30…300 cm	
RU130U-M30E-LIU2PN8X2T-H1151	switching and analog output IO-Link	teach cable + teach buttons + IO-Link	15…130 cm	
RU300U-M30E-LIU2PN8X2T-H1151			30…300 cm	

Accessories

	Type	Description
	TX1-Q20L60	Teach adapter for programming the measurement range
	USB-2-IOL-0002	IO-Link master with built-in USB port for high-end version

*for other cable lengths and qualities, see www.turck.com

Notes

Notes

Warranty Terms and Conditions

RISK OF LOSS

Delivery of the equipment to a common carrier shall constitute delivery to the Purchaser and the risk of loss shall transfer at that time to Purchaser. Should delivery be delayed due to an act or omission on the part of the Purchaser, risk of loss shall transfer to the Purchaser upon notification by TURCK Inc. that the order is complete and ready for shipment.

WARRANTIES

TURCK INC. (hereinafter "TURCK") offers five (5) WARRANTIES to cover all products sold. They are as follows:

1) The **12-MONTH WARRANTY** is available for the products listed - generally those not covered by **LIFETIME**, **5-YEAR**, **24-MONTH** or **18-MONTH** warranty. No registration required.
2) The **18-MONTH WARRANTY** is available for the products listed - generally those not covered by **LIFETIME** or **5-YEAR WARRANTY**. No registration is required.
3) The **24-MONTH WARRANTY** is available for the products listed - generally those not covered by **LIFETIME**, **5-YEAR** or **18-MONTH**. No registration is required.
4) The **5-YEAR WARRANTY** is available generally for the products listed. No registration is required.
5) A **LIFETIME WARRANTY** is available for the products listed. It becomes effective when the accompanying TURCK **LIFETIME WARRANTY REGISTRATION** is completed and returned to TURCK.

GENERAL TERMS AND CONDITIONS FOR ALL WARRANTIES

- **12-MONTH STANDARD WARRANTY**
- **18-MONTH STANDARD WARRANTY**
- **24-MONTH STANDARD WARRANTY**
- **5-YEAR WARRANTY**
- **LIFETIME WARRANTY**

TURCK warrants the Products covered by the respective WARRANTY AGREEMENTS to be free from defects in material and workmanship under normal and proper usage for the respective time periods listed above from the date of shipment from TURCK. In addition, certain specific terms apply to the various WARRANTIES.

THESE EXPRESS WARRANTIES ARE IN LIEU OF AND EXCLUDE ALL OTHER REPRESENTATIONS MADE - BOTH EXPRESSED AND IMPLIED. THERE ARE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE FOR PRODUCTS COVERED BY THESE TERMS AND CONDITIONS.

TURCK warrants that the goods sold are as described, but no promise, description, affirmation of fact, sample model or representation, oral or written shall be part of an order, unless set forth in these terms and conditions, or are in writing and signed by an authorized representative of TURCK. These WARRANTIES do not apply to any Product which has been subject to misuse, negligence, or accident - or to any Product which has been modified or repaired, improperly installed, altered, or disassembled - except according to TURCK's written instructions.

These WARRANTIES are subject to the following conditions:

1) These WARRANTIES are limited to the electronic and mechanical performance only, as expressly detailed in the Product specifications and NOT to cosmetic performance.
2) These WARRANTIES shall not apply to any cables attached to, or integrated with the Product. However, the **18-MONTH WARRANTY** shall apply to cables sold separately by TURCK.
3) These WARRANTIES shall not apply to any Products which are stored, or utilized, in harsh environmental or electrical conditions outside TURCK's written specifications.
4) The WARRANTIES are applicable only to Products shipped from TURCK subsequent to January 1, 1988.

ADDITIONAL SPECIFIC TERMS FOR:
(12-MONTH STANDARD WARRANTY) for Linear Displacement Transducers, EZ Track, RFID Products, Draw Wire Assemblies and Slip Rings.

(18-MONTH STANDARD WARRANTY) FOR Q-TRACK INDUCTIVE SENSORS, ULTRASONIC SENSORS, FLOW SENSORS, PRESSURE SENSORS, TEMPERATURE SENSORS, INCLINOMETERS, CABLES AND ALL NON-SENSING PRODUCTS SOLD BY TURCK INC. INCLUDING MULTI-SAFE, MULTI-MODUL, MULTI-CART AND RELATED AMPLIFIER PRODUCTS, RELAYS AND TIMERS.

(24-MONTH STANDARD WARRANTY) FOR ENCODERS excluding Draw Wire Assemblies.

5-YEAR WARRANTY FOR INDUCTIVE AND CAPACITIVE PROXIMITY SENSORS: The periods covered for the above WARRANTIES and Products shall be 12 MONTHS, 18-MONTHS, 24-MONTHS and 5-YEARS, respectively, from the date of shipment from TURCK.

LIFETIME WARRANTY (OPTIONAL - REGISTRATION REQUIRED) FOR INDUCTIVE, INDUCTIVE MAGNET OPERATED AND CAPACITIVE PROXIMITY SENSORS SOLD TO THE ORIGINAL PURCHASER FOR THE LIFETIME OF THE ORIGINAL APPLICATION.

Warranty Terms and Conditions

The following terms apply to the LIFETIME WARRANTY in addition to the General Terms:

1) This WARRANTY shall be effective only when the LIFETIME WARRANTY REGISTRATION has been completed, signed by the End User and an authorized TURCK Representative or Distributor and has been received by TURCK no later than six (6) months after installation in the End User's Plant, or two (2) years from the date product was shipped from TURCK, whichever is sooner.
2) This warranty is available only to TURCK's authorized Representatives, Distributors and to the Original User. (The term "Original User" means that person, firm, or corporation which first uses the Product on a continuous basis in connection with the operation of a production line, piece of machinery, equipment, or similar device.) In the event the ownership of the product is transferred to a person, firm or corporation other than the Original User, this WARRANTY shall terminate.
3) This WARRANTY is applicable only to the Original Application. In the event the machinery, equipment, or production line to which the Product is connected, or on which it is installed, is substituted, changed, moved or replaced, the WARRANTY shall terminate.
4) This WARRANTY shall be valid only if the Product was purchased by the Original User from TURCK, or from an authorized TURCK Distributor, or was an integral part of a piece of machinery and equipment obtained by the Original user from an Original Equipment Manufacturer, which itself, was purchased directly from TURCK or from an authorized Distributor.

PURCHASER'S REMEDIES

This Remedy shall apply to all WARRANTIES. If a TURCK Distributor desires to make a WARRANTY Claim, the Distributor shall, if requested by TURCK, ship the Product to TURCK's factory in Minneapolis, Minnesota, postage or freight prepaid. If the User desires to make a WARRANTY Claim, they shall notify the authorized TURCK Distributor from whom it was purchased or, if such Distributor is unknown, shall notify TURCK. TURCK shall, at its option, take any of the following two courses of action for any products which TURCK determines are defective in materials or workmanship.

1) Repair or replace the Product and ship the Product to the Original Purchaser or to the authorized TURCK Distributor, postage or freight prepaid; or
2) Repay to the Original Purchaser that price paid by the Original Purchaser; provided that if the claim is made under the LIFETIME WARRANTY, and such Product is not then being manufactured by TURCK, then the amount to be repaid by TURCK to the Original Purchaser shall be reduced according to the following schedule:

Number of Years Since Date of Purchase by Original Purchaser	Percent of Original Purchase Price To Be Paid by TURCK
10	50%
15	25%
20	10%
More than 20	5%

PURCHASER'S REMEDIES SHALL BE LIMITED EXCLUSIVELY TO THE RIGHT OF REPLACEMENT, REPAIR OR REPAYMENT AS PROVIDED AND DOES NOT INCLUDE ANY LABOR COST OR REPLACEMENT AT ORIGINAL PURCHASER'S SITE. TURCK SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF ANY WARRANTY, EXPRESSED OR IMPLIED, APPLICABLE TO THE PRODUCT, INCLUDING WITHOUT LIMITATION, ANY DAMAGES RESULTING FROM PROPERTY DAMAGE, PERSONAL INJURY OR BUSINESS INTERRUPTION.

CONSIDER SAFETY AND PROTECTION PRECAUTIONS

TURCK takes great care to design and build reliable and dependable products, however, some products can fail eventually. You must take precautions to design your equipment to prevent property damage and personal injury in the unlikely event of failure. As a matter of policy, TURCK does NOT recommend the installation of electronic controls as the sole device FOR THE PROTECTION OF PERSONNEL in connection with power driven presses, brakes, shears and similar equipment and, therefore, the customer should build in redundancy or dual control using approved safety devices for these applications.

GOVERNING LAW

The sale and purchase of Products covered hereby and all terms and conditions hereof shall be governed by the law of the States of Minnesota.

TURCK sells its products through Authorized Distributors. These distributors provide our customers with technical support, service and local stock. TURCK distributors are located nationwide – including all major metropolitan marketing areas.
For Application Assistance or for the location of your nearest TURCK distributor, call:
1-800-544-7769

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B1104 B 07/15