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TURCK

Overview
Ultrasonic Sensors

Ultrasonic Sensors

The RU-U ultrasonic sensor series from Turck enables the user to cover large sensing ranges with fewer sensor variants. The Turck ultrasonic sensors in M18 and M30 housing styles thus effectively reduce the range of variants required for stock-keeping. This is made possible by the particularly short blind zones of the sensors, which offer large sensing ranges at the same time. In order to offer the right sensor for every application with only a few sensor variants, Turck has increased the versatility of the individual models: The simple compact version of the RU40 and RU100 modules thus enables the user to set diffuse mode and retroreflective operation as well as NC and NO switching outputs with a teach adapter. The standard sensor variants offer several operating modes and enable the setting of switch windows or two separate switch points, either by a teach adapter or via a teach button directly on the sensor. The High-End versions can be operated as a switch and as an analog sensor. Different operating modes, temperature compensation or the output function can also be set via IO-Link. If several sensors are installed next to each other, the customer can set the sensor parameters in synchronization or multiplex mode, in order to prevent mutual interference of the sensors.

Operating principle

The operation of the sensors is based on the time of flight principle. With this a sonic pulse is emitted and the time required by the reflected signal to be received again by the same sonic transducer is measured. The distance to the object is calculated on the basis of the known speed of sound in air and output as the measured value or as a switch signal. As the speed of sound depends on the air temperature, the sensors use a separate temperature measurement to compensate the time of flight difference at different temperatures.

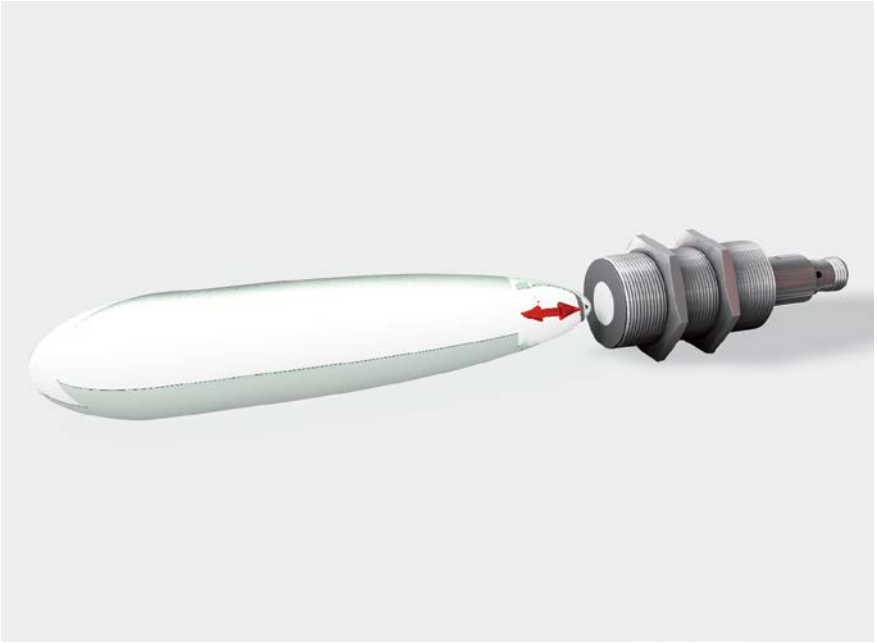
Ultrasonic sensor technology is generally an important link in the field of industrial sensors, which is positioned between inductive and photoelectric sensors on account of its possible object detection ranges. However, the measuring principle takes a special place as it is not based on an electromagnetic but a mechanical operating principle and therefore requires some additional knowledge for the application. Useful information on this is available at: www.turck.en/ru

Contents

Features

Large measuring range

The newly developed sonic transducers enable large measuring ranges for the entire sensor series of up to 130 cm in the M18 version and 600 cm in the M30 version. The 300 cm version in the M30 in particular operates without the need for an enlarged transducer head. This increases the options available in existing applications and enlarges the application range.



Short blind zone

The extremely short blind zone (e.g. only 2.5 cm in the M18 version with 40 cm range) ensures maximum downward compatibility. This enables the reliable detection of objects close to the sensor and optimum adaption of mounting depths – such as for level monitoring applications. As the blind zone has to be kept free to exclude signal errors, a short blind zone also improves the possibilities for mounting and effective object detection.

Robust mechanical design

The highly robust housing with a continuous threaded barrel completely made of metal is particularly short and stands out on account of the metal M12 connector, which is turned as one piece with the threaded sleeve. This eliminates any potential weak points that could cause damage in harsh environments and at low temperatures. The thread runs over the entire length of the sensor so that the mounting position can be varied as required within the mounting bracket.

Flush-front membrane

The smooth sonic transducer front of the M18 and M30 sensors reliably prevents contamination and the formation of particle deposits. The mechanical movement of the membrane even shakes off deposits and thus cleans itself. Particle deposits that can occur when the air humidity is high can likewise be simply wiped off completely, without any residue remaining in the transition area between the transducer layer and the transducer ring. Damage arising from sharp and pointed cleaning objects therefore becomes a thing of the past.

Features

Easy teach

In order for the user to set the sensors simply and intuitively without a PC, all M18 and M30 ultrasonic sensors are provided with a teach-in function which can be implemented via pin 5. The start of switch and measuring ranges can thus be set easily without the use of any external software.

The teach-in is carried out either via the teach adapter using the typical TURCK Easy Teach function or via sensor variants with integrated pushbuttons. The pushbuttons are fitted inside the metal housing and are thus protected from accidental actuation. The setting is carried out inside a fixed time window after a preceding voltage reset. The subsequent automatic lock reliably excludes the possibility of the sensor settings from being accidentally changed.

The devices of the M18 compact design also have a teach input on PIN 2, which makes this series 100% downward compatible with the previous series.

IO-Link interface

Besides setting via the teach-in function, the High-End variants with a switch and analog output can also be parameterized via the version 1.1 IO-Link interface. The devices can be configured in different operating modes such as in opposed mode with exclusive send and receive operation. Other features include settings for the time in which the teach button can be used after a voltage reset or also the temperature compensation setting via the internal or optional external temperature sensor. This last feature enables a more precise measuring result by including the ambient temperature in the calculation.

The user has the choice between a rising or falling characteristic for the analog output signal, and the user can set the hysteresis for the switching output. If two independent switching outputs are required instead of the switching output and analog output, these can be set to PNP or NPN switching output types with an NC or NO function.

If several devices are installed in the same environment, any mutual interference must be prevented. The sensors can therefore be synchronized or set to multiplex mode, in which the individual devices operate sequentially. The 16-bit data width of the process value can be read at a transfer rate of 38,400 baud via the supported COM2 communication type.

Benefits for the User

The features of the new RU-U ultrasonic sensor series offer clear benefits for the user:

System availability

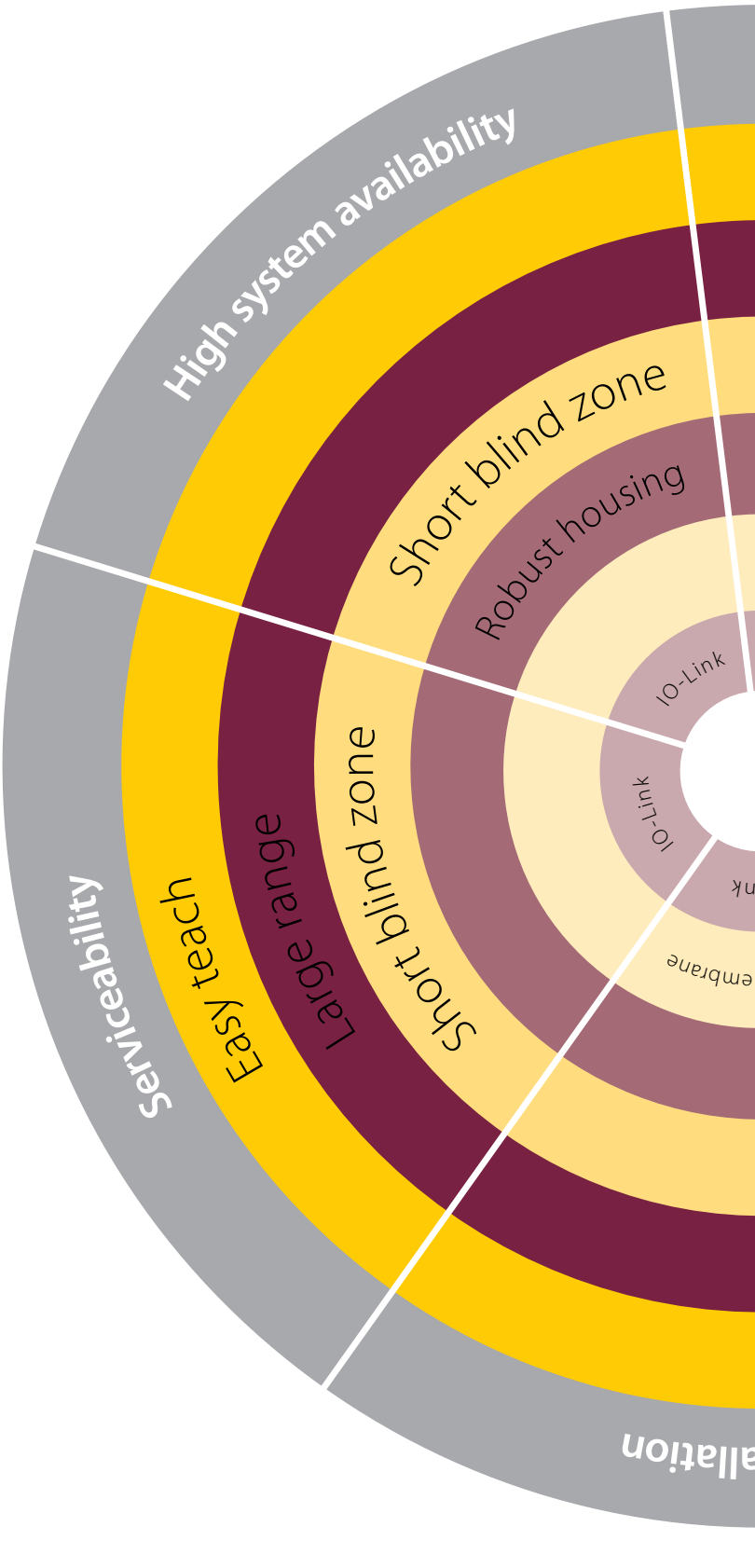
Maximum process safety is provided by the robust metal housing design in which the threaded sleeve and the connector thread are made from one piece, and also from the smooth front on which any dirt cannot accumulate. The high interference immunity also significantly contributes to the availability of this product line.

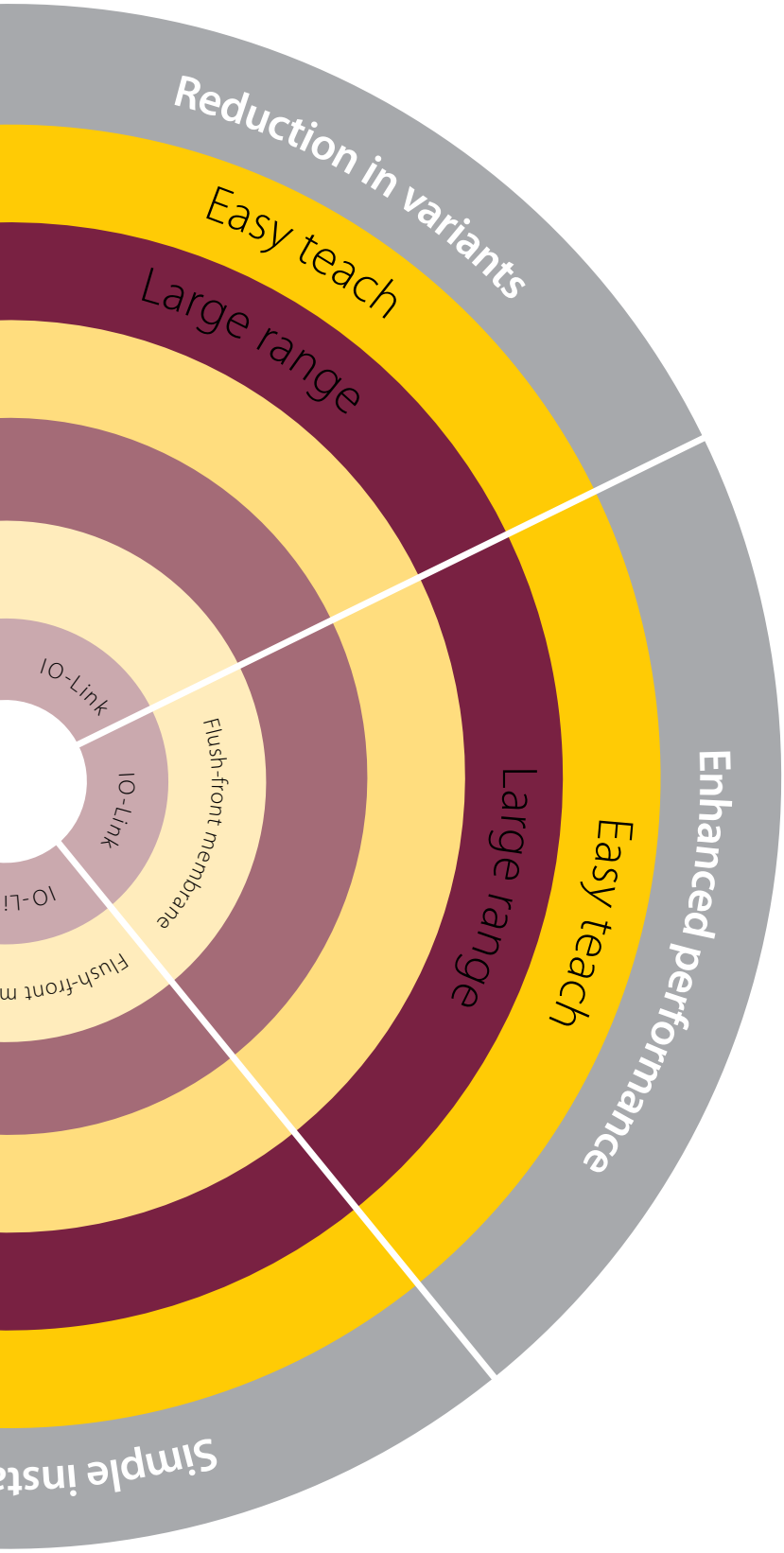
Serviceability

As an alternative to the flexibly configurable PNP or NPN switching outputs and the current or voltage analog outputs, IO-Link enables the sensor to be configured easily via software precisely to the requirements of the application. Besides the parameterization functions, IO-Link also enables the process value to be read out routinely at any time if the standard is used as a communication channel. This flexibility enormously increases serviceability and shortens the replacement lead time.

Installation

Turck Easy Teach simplifies the installation and commissioning of the new ultrasonic sensors. The concept enables the user, for example, to precisely define the switching or measuring range limits without the uncertainty arising from turning a potentiometer. It is also possible to set parameters via IO-Link using the PACTware™ software standard popular with many suppliers. No proprietary software modules complicate the entry of the different settings and the maintenance of updates is considerably easier.





Variant reduction

With their extremely short blind zones the sensors can also detect very close objects, thus providing greater flexibility for mounting. Together with the larger measuring ranges and the possibility to teach diffuse mode, retroreflective mode as well as NC and NO operation, the user can cover a wide range of applications with fewer models of TURCK's new ultrasonic sensor series.

Enhanced performance

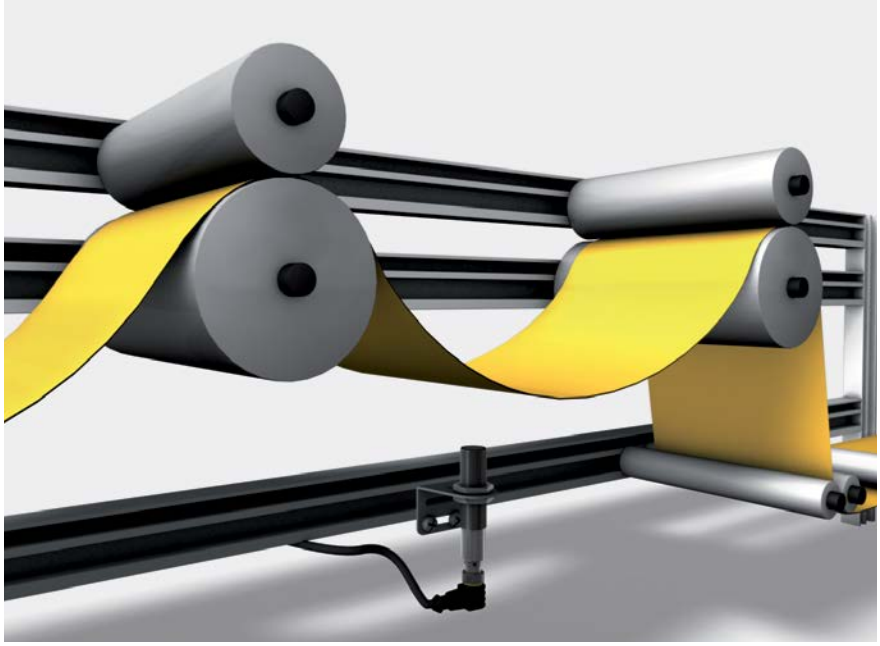
The newly developed sonic transducers enable larger measuring ranges up to 130 cm in the M18 design and 600 cm in the M30 version. Larger transducer heads for larger ranges are no longer required. Together with the short blind zones this increases the options available in existing applications and widens the application range.

- IO-Link
- Flush-front membrane
- Robust housing
- Short blind zone
- Large range
- Easy Teach

Application Examples

Conveyor belt

Ultrasonic sensors are ideal for measuring the profile of bulk material on a conveyor belt in harsh and dust-laden environments. The measuring is implemented above the conveyor belt. Several sensors are mounted here next to each other in order to detect the entire width of the belt. To prevent any mutual interaction the sensor combination uses multiplex operation in which each sensor has its own address. In this mode the sensors operate cyclically in sequence. It is also possible to selectively activate each individual sensor via the controller. If the sensors are arranged further apart, the combination can also be synchronized.

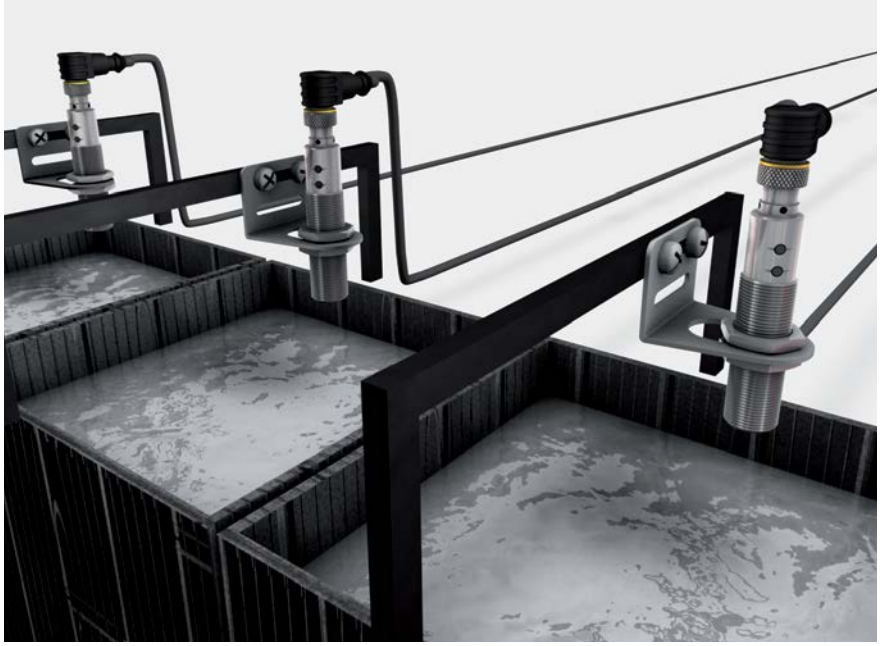


Sag control

Foils, paper and other winding materials are often checked for sag when wound or unwound. This task is mostly carried out by ultrasonic sensors as they are not affected by surface features such as the color of the material or by dust produced from wear. Depending on the size of the sag, detection ranges of up to several meters can be measured accurately to the nearest millimeter. As a limit switch the sensor is used for starting and stopping the drive. However, it can also be used to control speed via the analog output.

Glass pane detection

Clear objects which are difficult to detect using photoelectric sensors are not a problem for ultrasonic sensors. From the right angle, the sensor also detects a glass pane reliably from a great distance. This makes it suitable, for example, in final assembly applications for checking the presence of clear objects, but also other mounted components such as seats, valves, seals or general interiors – as it does not depend on surface colors. The ultrasonic sensor technology also simplifies the functional testing of moving parts, such as for the end position control of seats or the open position of electrically operated car roofs.



Level monitoring

Liquids are a very good reflector of ultrasonic waves if they do not form any foam. Ultrasonic sensors are therefore ideal for monitoring the level of liquid containers. Spray and droplets do not affect the sensor and it even cleans itself through the through the movement of the sonic transducer. The sensor enables several switch limit values, continuous level measuring or also the direct activation of a pump. Due to its short blind zone, the sensor can be mounted where space is limited, as a minimum clearance from the surface of the liquid is no longer required.

Variants

The new RU-U ultrasonic sensor series consists of the three compact, standard and High-End series which replace the existing ultrasonic sensor portfolio.

Compact series

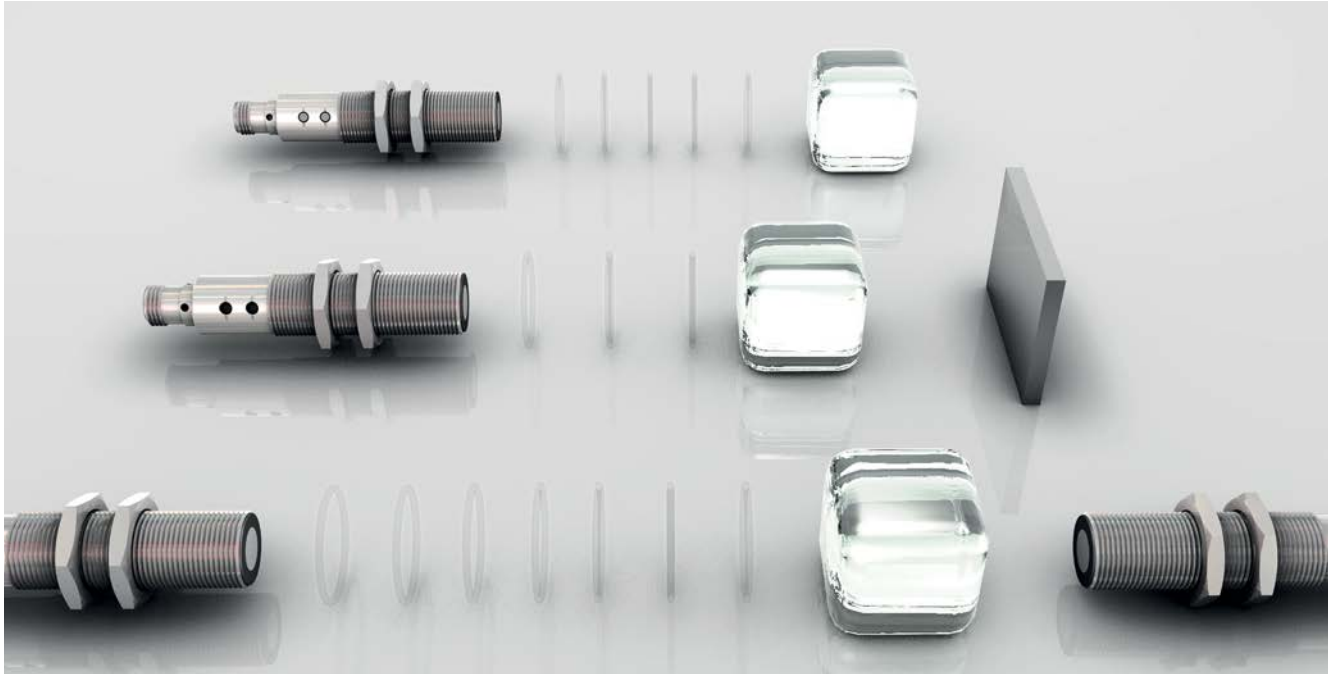
The compact version (RU40 and RU100) with ranges up to 40 cm and 100 cm drastically reduces the number of types since the output function can now be selected directly via a teach adapter or cable at pin 5. The compact series offers maximum ranges in the compact M18 design. The devices are available in diffuse mode and retroreflective mode.

Standard series

The standard variants can likewise be set via pin 5, or depending on the model, by means of a teach adapter or teach buttons on the device. With their double switching output, they round off the range with direct setting options for switch range limits and the output function. The sensors offer two independent switching outputs with adjustable switch points or also switch windows or analog output. It is also possible to teach the sensor for a fixed surface and thus configure a retroreflective opposed mode sensor, by which an object interrupts the signal reflection from the taught surface.

High-End

The High-End series is the switch/analog version which, besides the programming via teach buttons, can also be parameterized with different settings via IO-Link and even function as a double switch if necessary. The standard and High-End variants in the M30 design round off the Turck ultrasonic sensor with larger ranges.



The High-End series can be set to different operating modes such diffuse mode, retroreflective opposed mode for a fixed reflector or also to opposed mode with an emitter and receiver.

Ultrasonic sensors – Range overview

	M8		M30		CK40
					
Compact 1 switching output	40 cm 100 cm				
Standard 2 switching outputs		40 cm 130 cm	40 cm 130 cm 300 cm	600 cm	200 cm
Standard Switch and analog output					200 cm
High-End Switch and analog output		40 cm 130 cm	130 cm 300 cm	600 cm	

Compact Series – Cylindrical Design

The very robust compact variant offers ranges up to 100 cm and is available in straight and angled design. The compact devices are especially suited for use in applications with restricted installation conditions. Little installation effort and high availability make commissioning and maintenance easier for the user.

Features

- Large measuring range
- Short blind zone
- Robust mechanics thanks to metal housing and metal connector
- Front-flush diaphragm
- Easy teaching via pin 2 or pin 5
- Short design

Type code

RU 100 U – M18 MS – U P 8 X2 – H1 1 5 1

RU 100 U Series – **M18 MS** Design – **U P 8 X2** Electrical version –

Series
- **U** universal
- **L** retroreflective sensor

Range
- **…** [cm]

Functional principle
- **RU** ultrasonic sensor

Housing length
- **M** medium-sized
- **S** sonic converter angled

Housing
- **M…** threaded barrel, metal, Ø in [mm]

Indication
- **X2** 2 x LED/2-color LED

Voltage range
- **8** 15…30 VDC

Output mode
- **N** NPN output
- **P** PNP output

Output function
- **U** adjustable NO/NC

H1 1 5 1 Electrical Connection: Connector

Assignment
- **1** standard assignment

… contacts
- **5** … contacts

Connector type
- **1** straight

Connector design
- **H1** flange connector M12 × 1

Compact Series – M18 – Diffuse Mode – Switching

General data			
Operating mode	Diffuse mode ultrasonic sensor	**Transducer material**	Plastic, Epoxyd resin and PU foam
Operating voltage	15… 30 VDC	**Connection**	Flange connector, M12 x 1
DC rated operational current	≤ 150 mA	**Protection class**	IP67
Configuration	via pin 2 or pin 5	**Ambient temperature**	-25 …+70 °C
Output 1	Switching output	**Temperature drift**	± 1.5 % of full scale
Housing material	Metal, CuZn, nickel-plated		

Types and Data – Selection table

Type	Ident no.	Range [cm]	Output Function	Radiation direction
RU40U-M18M-UP8X2-H1151	1610008	2.5…40	PNP	straight
RU40U-M18MS-UP8X2-H1151	1610009	2.5…40	PNP	side
RU40U-M18M-UN8X2-H1151	1610080	2.5…40	NPN	straight
RU40U-M18MS-UN8X2-H1151	1610082	2.5…40	NPN	side
RU100U-M18M-UP8X2-H1151	1610010	15…100	PNP	straight
RU100U-M18MS-UP8X2-H1151	1610011	15…100	PNP	side
RU100U-M18M-UN8X2-H1151	1610081	15…100	NPN	straight
RU100U-M18MS-UN8X2-H1151	1610083	15…100	NPN	side

Compact Series – M18 – Retroreflective – Switching

General data			
Operating mode	Retroreflective ultrasonic sensor	**Transducer material**	Plastic, Epoxyd resin and PU foam
Operating voltage	15… 30 VDC	**Connection**	Flange connector, M12 x 1
DC rated operational current	≤ 150 mA	**Protection class**	IP67
Configuration	via pin 2 or pin 5	**Ambient temperature**	-25 …+70 °C
Output 1	Switching output	**Temperature drift**	± 1.5 % of full scale
Housing material	Metal, CuZn, nickel-plated		

Types and Data – Selection table

Type	Ident no.	Range [cm]	Output Function	Radiation direction
RU40L-M18M-UP8X2-H1151	1610076	2.5…40	PNP	straight
RU40L-M18MS-UP8X2-H1151	1610078	2.5…40	PNP	side
RU40L-M18M-UN8X2-H1151	1610084	2.5…40	NPN	straight
RU40L-M18MS-UN8X2-H1151	1610086	2.5…40	NPN	side
RU100L-M18M-UP8X2-H1151	1610077	15…100	PNP	straight
RU100L-M18MS-UP8X2-H1151	1610079	15…100	PNP	side
RU100L-M18M-UN8X2-H1151	1610085	15…100	NPN	straight

Type	Ident no.	Range [cm]	Output Function	Radiation direction
RU100L-M18MS-UN8X2-H1151	1610087	15…100	NPN	side

Compact Series – M18 – Diffuse Mode – Measuring

General data			
Operating mode	Diffuse mode ultrasonic sensor	**Transducer material**	Plastic, Epoxyd resin and PU foam
Operating voltage	15… 30 VDC	**Connection**	Flange connector, M12 x 1
DC rated operational current	≤ 150 mA	**Protection class**	IP67
Configuration	via pin 2 or pin 5	**Ambient temperature**	-25 …+70 °C
Output Function	Frequency	**Temperature drift**	± 1.5 % of full scale
Housing material	Metal, CuZn, nickel-plated		

Types and Data – Selection table

Type	Ident no.	Range [cm]	Radiation direction
RU40U-M18M-LFX-H1151	1610021	2.5…40	straight
RU40U-M18MS-LFX-H1151	1610019	2.5…40	side
RU100U-M18M-LFX-H1151	1610022	15…100	straight
RU100U-M18MS-LFX-H1151	1610020	15…100	side

Standard Series – Cylindrical Design

The standard variant is available as M18 and M30 versions and has two independently adjustable switching outputs. The switching outputs can either be parametrized via the external teaching adapter or directly on the sensor via the integrated button. Thanks to further setting options, the device can also be used as a retroreflective sensor or the hysteresis can be adapted to the application. The devices achieve ranges of up to 600 cm.

Features

- Large measuring range
- Short blind zone
- Robust mechanics thanks to metal housing and metal connector
- Front-flush diaphragm
- Easy teaching via pin 5 or button
- Short design

Type code

RU 130 U – M30 E – 2U P 8 X2 T – H1 1 5 1

RU 130 U Series

Series
- **U** universal

Range
- **…** [cm]

Functional principle
- **RU** ultrasonic sensor

–

M30 E Design

Housing length
- **E** long
- **M** medium-sized
- **S** sonic converter angled

Housing
- **M…** threaded barrel, metal, Ø in [mm]

–

2U P 8 X2 T Electrical version

T
- **T** with teach button
- **blank** without teach button

Indication
- **X2** 2 x LED/2-color LED

Voltage range
- **8** 15…30 VDC

Output mode
- **P** PNP output

Output function
- **2** number outputs, if >1
- **U** adjustable NO/NC

–

H1 1 5 1 Electrical connection: Connector

Assignment
- **1** standard assignment

… contacts
- **5** … contacts

Connector type
- **1** straight

Connector design
- **H1** flange connector M12 × 1

Standard Series – M18 – Universal – Switching

General data			
Operating mode	Diffuse mode ultrasonic sensor	**Transducer material**	Plastic, Epoxyd resin and PU foam
Operating voltage	15… 30 VDC	**Connection**	Flange connector, M12 x 1
DC rated operational current	≤ 150 mA	**Protection class**	IP67
Output 1	Switching output	**Ambient temperature**	-25 …+70 °C
Output 2	Switching output	**Temperature drift**	± 1.5 % of full scale
Housing material	Metal, CuZn, nickel-plated		

Types and Data – Selection table

Type	Ident no.	Range [cm]	Configuration	Radiation direction
RU40U-M18E-2UP8X2-H1151	1610012	2.5…40	via pin 5	straight
RU40U-M18ES-2UP8X2-H1151	1610013	2.5…40	via pin 5	side
RU40U-M18E-2UP8X2T-H1151	1610016	2.5…40	via pin 5 or button	straight
RU130U-M18E-2UP8X2-H1151	1610014	15…130	via pin 5	straight
RU130U-M18ES-2UP8X2-H1151	1610015	15…130	via pin 5	side
RU130U-M18E-2UP8X2T-H1151	1610018	15…130	via pin 5 or button	straight

Switchable between diffuse mode and retroreflective mode

Standard Series – M30 – Universal – Switching

General data			
Operating mode	Diffuse mode ultrasonic sensor	**Transducer material**	Plastic, Epoxyd resin and PU foam
Operating voltage	15… 30 VDC	**Connection**	Flange connector, M12 x 1
DC rated operational current	≤ 150 mA	**Radiation direction**	straight
Output 1	Switching output	**Protection class**	IP67
Output 2	Switching output	**Temperature drift**	± 1.5 % of full scale
Housing material	Metal, CuZn, nickel-plated		

Types and Data – Selection table

Type	Ident no.	Range [cm]	Configuration	Ambient temperature [°C]
RU40U-M30M-2UP8X2-H1151	1610032	2.5…40	via pin 5	-25 …+70
RU130U-M30M-2UP8X2-H1151	1610034	15…130	via pin 5	-25 …+70
RU130U-M30E-2UP8X2T-H1151	1610038	15…130	via pin 5 or button	-25 …+70
RU300U-M30M-2UP8X2-H1151	1610036	30…300	via pin 5	-25 …+70
RU300U-M30E-2UP8X2T-H1151	1610040	30…300	via pin 5 or button	-25 …+70
RU600U-M30M-2UP8X2-H1151	1610037	60…600	via pin 5	-25 …+50
RU600U-M30E-2UP8X2T-H1151	1610041	60…600	via pin 5 or button	-25 …+50

Switchable between diffuse mode and retroreflective mode

Standard Series – Rectangular Design

The rectangular CK40 with integrated connector or the CP40 variants with terminal chamber combine the advantages of a large detection range with a wide opening angle and a very small blind zone. These sensors are thus ideally suited for safe detection of objects that provide only a weak reflection signal due to their geometry or are moved in a large environment. Both the switching as well as the measuring devices can be customized easy to use via teach button.

Features

- Large measuring range
- Very short blind zone
- Easy teaching via pin 5 or button
- Very large opening angle

Type code

RU 200 – CK40 – LIU2 P 8 X2 T – H1 1 5 1

RU 200 Series

Range
… [cm]

Functional principle
RU ultrasonic sensor

CK40 Design

Housing
CK… rectangular, plastic, flange connector, dimensions in mm
CP… rectangular, plastic terminal chamber, dimensions in mm

LIU2 P 8 X2 T Electrical version

T with teach button
blank without teach button

Indication
X2 number of LEDs

Voltage range
8 15…30 VDC

Output mode
N NPN output
P PNP output

Output function
2 number outputs, if > 1
LIU analog output and voltage

H1 1 5 1 Electrical Connection: Connector

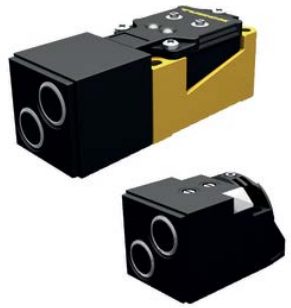
Assignment
1 standard assignment

… contacts
5 … contacts

Connector type
1 straight

Connector design
H1 flange connector M12 × 1

Standard Series – 40 x 40 – Universal – Switching



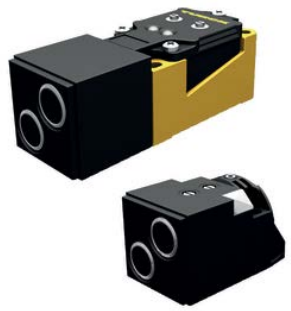
General data			
Operating mode	Diffuse mode ultrasonic sensor	**Output 2**	Switching output
Range	5…200 cm	**Housing material**	Plastic
Operating voltage	15… 30 VDC	**Radiation direction**	straight
DC rated operational current	≤ 150 mA	**Protection class**	IP40
Output 1	Switching output	**Ambient temperature**	0 …+70 °C

Types and Data – Selection table

Type	Ident no.	Configuration	Output Function	Connection
RU200-CK40-2UP8X2T-H1151	1610051	via pin 5 or button	PNP	Flange connector, M12 x 1
RU200-CK40-2UN8X2T-H1151	1610057	via pin 5 or button	NPN	Flange connector, M12 x 1
RU200-CP40-2UP8X2T	1610052	via button	PNP	terminal chamber, Terminal box with cable gland
RU200-CP40-2UN8X2T	1610055	via button	NPN	terminal chamber, Terminal box with cable gland

Variable orientation of active face in 5 directions, switchable between diffuse mode and retroreflective mode

Standard Series – 40 x 40 – Universal – Measuring



General data			
Operating mode	Diffuse mode ultrasonic sensor	**Output 2**	Analog output
Range	5…200 cm	**Housing material**	Plastic
Operating voltage	15… 30 VDC	**Radiation direction**	straight
DC rated operational current	≤ 150 mA	**Protection class**	IP40
Output 1	Switching output	**Ambient temperature**	0 …+70 °C

Types and Data – Selection table

Type	Ident no.	Configuration	Output Function	Connection
RU200-CK40-LIU2P8X2T-H1151	1610053	via pin 5 or button	PNP	Flange connector, M12 x 1
RU200-CK40-LIU2N8X2T-H1151	1610058	via pin 5 or button	NPN	Flange connector, M12 x 1
RU200-CP40-LIU2P8X2T	1610054	via button	PNP	terminal chamber, Terminal box with cable gland
RU200-CP40-LIU2N8X2T	1610056	via button	NPN	terminal chamber, Terminal box with cable gland

Variable orientation of active face in 5 directions, switchable between diffuse mode and retroreflective mode

High-End Series – Cylindrical Design

The high-end variant offers universal possibilities for adjustment and adaptation also to the most difficult application conditions. Operation as a diffuse mode, retroreflective or opposed mode sensor is possible, as well as the synchronization of multiple sensors to protect against mutual interference. On demand, process values can be transferred directly or settings changed during operation via IO-Link. The presence of the objects is typically emitted via the switching output and the distance via the analog output. Highest accuracy can be achieved through the possibility to adjust the temperature compensation.

Features

- Large measuring range
- Short blind zone
- Robust mechanics thanks to metal housing and metal connector
- Front-flush diaphragm
- Easy teaching via pin 5 or button
- IO-Link
- Temperature compensation

Type code

RU 600 U – M30 E – LIU2 PN 8 X2 T – H1 1 5 1

RU 600 U Series – **M30 E** Design – **LIU2 PN 8 X2 T** Electrical version –

Series
- **U** universal
- **L** retroreflective sensor

Range
- **…** [cm]

Functional principle
- **RU** ultrasonic sensor

Housing length
- **E** long
- **S** sonic converter angled

Housing
- **M…** threaded barrel, metal, Ø in [mm]

T with teach button

blank without teach button

Indication
- **X2** 2 x LED/2-color LED

Voltage range
- **8** 15…30 VDC

Output mode
- **N** NPN output
- **P** PNP output

Output function
- **U** adjustable NO/NC

H1 1 5 1 Electrical Connection: Connector

Assignment
- **1** standard assignment

… contacts
- **5** … contacts

Connector type
- **1** straight

Connector design
- **H1** flange connector M12 × 1

High-End Series – M18 – Universal – Switching/Measuring

General data			
Operating mode	Diffuse mode ultrasonic sensor	**Housing material**	Metal, CuZn, nickel-plated
Operating voltage	15… 30 VDC	**Transducer material**	Plastic, Epoxyd resin and PU foam
DC rated operational current	≤ 150 mA	**Connection**	Flange connector, M12 x 1
Configuration	via pin 5, button or IO-Link	**Protection class**	IP67
Output 1	Switching output or IO-Link mode	**Ambient temperature**	-25 …+70 °C
Output 2	Analog output	**Temperature drift**	± 1.5 % of full scale
IO-Link Specification	V 1.1		

Types and Data – Selection table

Type	Ident no.	Range [cm]	Radiation direction
RU40U-M18E-LIU2PN8X2T-H1151	1610024	2.5…40	straight
RU40U-M18ES-LIU2PN8X2T-H1151	1610025	2.5…40	side
RU130U-M18E-LIU2PN8X2T-H1151	1610026	15…130	straight
RU130U-M18ES-LIU2PN8X2T-H1151	1610027	15…130	side

Switchable between diffuse mode, retroreflective mode and PNP/NPN

High-End Series – M30 – Universal – Switching/Measuring

General data			
Operating mode	Diffuse mode ultrasonic sensor	**Housing material**	Metal, CuZn, nickel-plated
Operating voltage	15… 30 VDC	**Transducer material**	Plastic, Epoxyd resin and PU foam
DC rated operational current	≤ 150 mA	**Connection**	Flange connector, M12 x 1
Configuration	via pin 5, button or IO-Link	**Radiation direction**	straight
Output 1	Switching output or IO-Link mode	**Protection class**	IP67
Output 2	Analog output	**Temperature drift**	± 1.5 % of full scale
IO-Link Specification	V 1.1		

Types and Data – Selection table

Type	Ident no.	Range [cm]	Ambient temperature [°C]
RU130U-M30E-LIU2PN8X2T-H1151	1610046	15…130	-25 …+70
RU300U-M30E-LIU2PN8X2T-H1151	1610048	30…300	-25 …+70
RU600U-M30E-LIU2PN8X2T-H1151	1610049	60…600	-25 …+50

Switchable between diffuse mode, retroreflective mode and PNP/NPN

High-End Series – Cylindrical Design for Hazardous Areas

Also for use in hazardous areas, the high-end series provides a selection of cylindrical sensors with universal possibilities for adjustment and adaptation to various application conditions. Operation as a diffuse mode, retroreflective or opposed mode sensor is possible, as well as the synchronization of multiple sensors to protect against mutual interference. On demand, process values can be transferred directly or settings changed during operation via IO-Link. The presence of the objects is typically emitted via the switching output and the distance via the analog output. Highest accuracy can be achieved through the possibility to adjust the temperature compensation.

Features

- Large measuring range
- Short blind zone
- Robust mechanics thanks to stainless steel housing
- Front-flush diaphragm
- Easy teaching via pin 5 or button
- IO-Link
- Temperature compensation
- Suitable for the Ex zones 2 and 22

Type code

RU 300 U – EM30 E – LIU2 PN 8 X2 T – H1 1 5 1 / 3GD

RU 300 U Series – **EM30 E** Design – **LIU2 PN 8 X2 T** Electrical version –

Series
- **U** universal

Range
- **…** [cm]

Functional principle
- **RU** ultrasonic sensor

Housing length
- **E** long

Housing
- **EM…** threaded barrel, stainless steel, Ø in [mm]

T with teach button
- **blank** without teach button

Indication
- **X2** 2 x LED/2-color LED

Voltage range
- **8** 15…30 VDC

Output mode
- **PN** bipolar

Output function
- **2** number outputs, if > 1
- **LIU** analog output and voltage

H1 1 5 1 Electrical Connection: Connector / **3GD** Approval

Assignment
- **1** standard assignment

… contacts
- **5** … contacts

Connector type
- **1** straight

Connector design
- **H1** flange connector M12 × 1

Approval
- **3D** ATEX II 3D approval
- **3G** ATEX II 3G approval
- **3GD** ATEX II 3G and II 3D approval

High-End Series – M18 – Universal – Switching/Measuring

General data			
Operating mode	Diffuse mode ultrasonic sensor	**Transducer material**	Plastic, Epoxyd resin and PU foam
Operating voltage	15… 30 VDC	**Connection**	Flange connector, M12 x 1
DC rated operational current	≤ 150 mA	**Radiation direction**	straight
Configuration	via pin 5, button or IO-Link	**Protection class**	IP67
Output 1	Switching output or IO-Link mode	**Ambient temperature**	-25 …+70 °C
Output 2	Analog output	**Temperature drift**	± 1.5 % of full scale
IO-Link Specification	V 1.1	**Device designation**	II 3 GD
Housing material	Stainless steel 1.4404 (AISI 316L)		

Types and Data – Selection table

Type	Ident no.	Range [cm]
RU40U-EM18E-LIU2PN8X2T-H1151/3GD	1610071	2.5…40
RU130U-EM18E-LIU2PN8X2T-H1151/3GD	1610072	15…130

Switchable between diffuse mode, retroreflective mode and PNP/NPN

High-End Series – M30 – Universal – Switching/Measuring

General data			
Operating mode	Diffuse mode ultrasonic sensor	**Housing material**	Stainless steel 1.4404 (AISI 316L)
Operating voltage	15… 30 VDC	**Transducer material**	Plastic, Epoxyd resin and PU foam
DC rated operational current	≤ 150 mA	**Connection**	Flange connector, M12 x 1
Configuration	via pin 5, button or IO-Link	**Radiation direction**	straight
Output 1	Switching output or IO-Link mode	**Protection class**	IP67
Output 2	Analog output	**Temperature drift**	± 1.5 % of full scale
IO-Link Specification	V 1.1	**Device designation**	II 3 GD

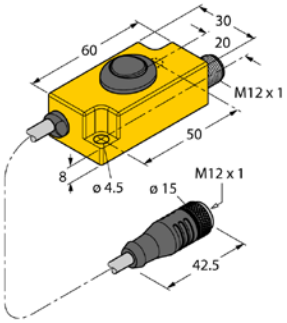
Types and Data – Selection table

Type	Ident no.	Range [cm]	Ambient temperature [°C]
RU130U-EM30E-LIU2PN8X2T-H1151/3GD	1610073	15…130	-25 …+70
RU300U-EM30E-LIU2PN8X2T-H1151/3GD	1610074	30…300	-25 …+70
RU600U-EM30E-LIU2PN8X2T-H1151/3GD	1610075	60…600	-25 …+50

Switchable between diffuse mode, retroreflective mode and PNP/NPN

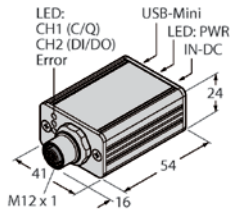
Accessories

TX1-Q20L60



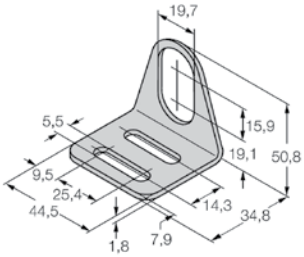
Teach adapter for inductive encoders, linear position, angle, ultrasonic and capacitive sensors

USB-2-IOL-0002



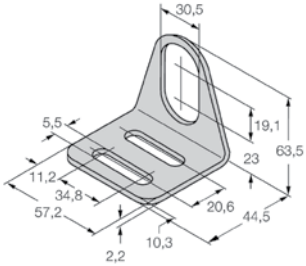
IO-Link Master with integrated USB port

MW-18



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

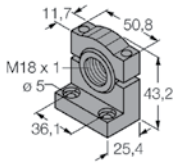
MW-30



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

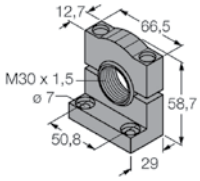
SMB18SF

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

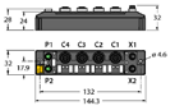


SMB30SC

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



TBEN-S2-4IOL

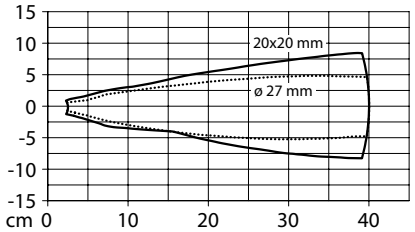


Compact multiprotocol I/O module, 4 IO-Link Master 1.1 Class A, 4 universal PNP digital channels 0.5 A

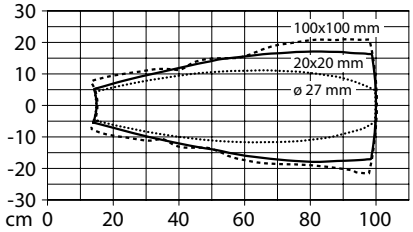
Performance Curves

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.

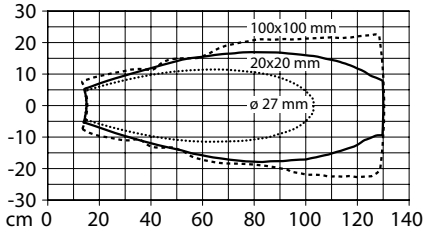
RU40



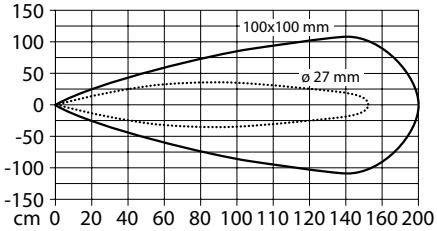
RU100



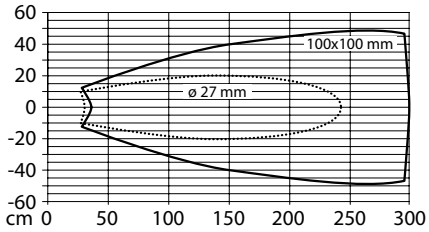
RU130



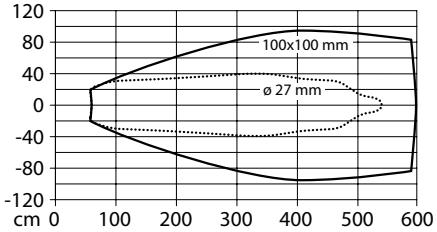
RU200



RU300



RU600



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