TURCK

Industrial Automation

CONTACTLESS ENCODERS

A WORLD FIRST

Sense it! Connect it! Bus it! Solve it!

New encoder eliminates the need for compromises

TURCK's new encoder means that the user no longer has to make a compromise between resolution and rugged design. All the measures required to protect encoders from mechanical stress using springs or double bearings are no longer necessary. Apart from the interference immunity and wear-free design of the system, the user also benefits from the parametrization and mounting concept that allows a single encoder model to be used as a universal encoder for a countless number of applications. This single model can replace several 100 different encoder types.

The mounting concept also keeps this universal approach: Adapter rings make it possible for the user to fit the positioning element to shafts of different diameters. He only has to keep a single encoder in stock which he can use for all applications on shafts up to 20 mm in diameter.

Fully potted electronics

The resonant circuit measuring principle makes it possible to design a fully potted sensor housing without seals, that is separate from the positioning element.

This therefore fully excludes the possibility of dust or water penetrating into the electronics. The contactless measuring principle of the encoder enables it to compensate for vibration and offset up to 4 mm.

Magnetic fields cannot disturb the measuring process anyway since the positioning element is not based on a magnet but on an inductive coil system, through which the sensor and the positioning element (resonator) can form an oscillation circuit.

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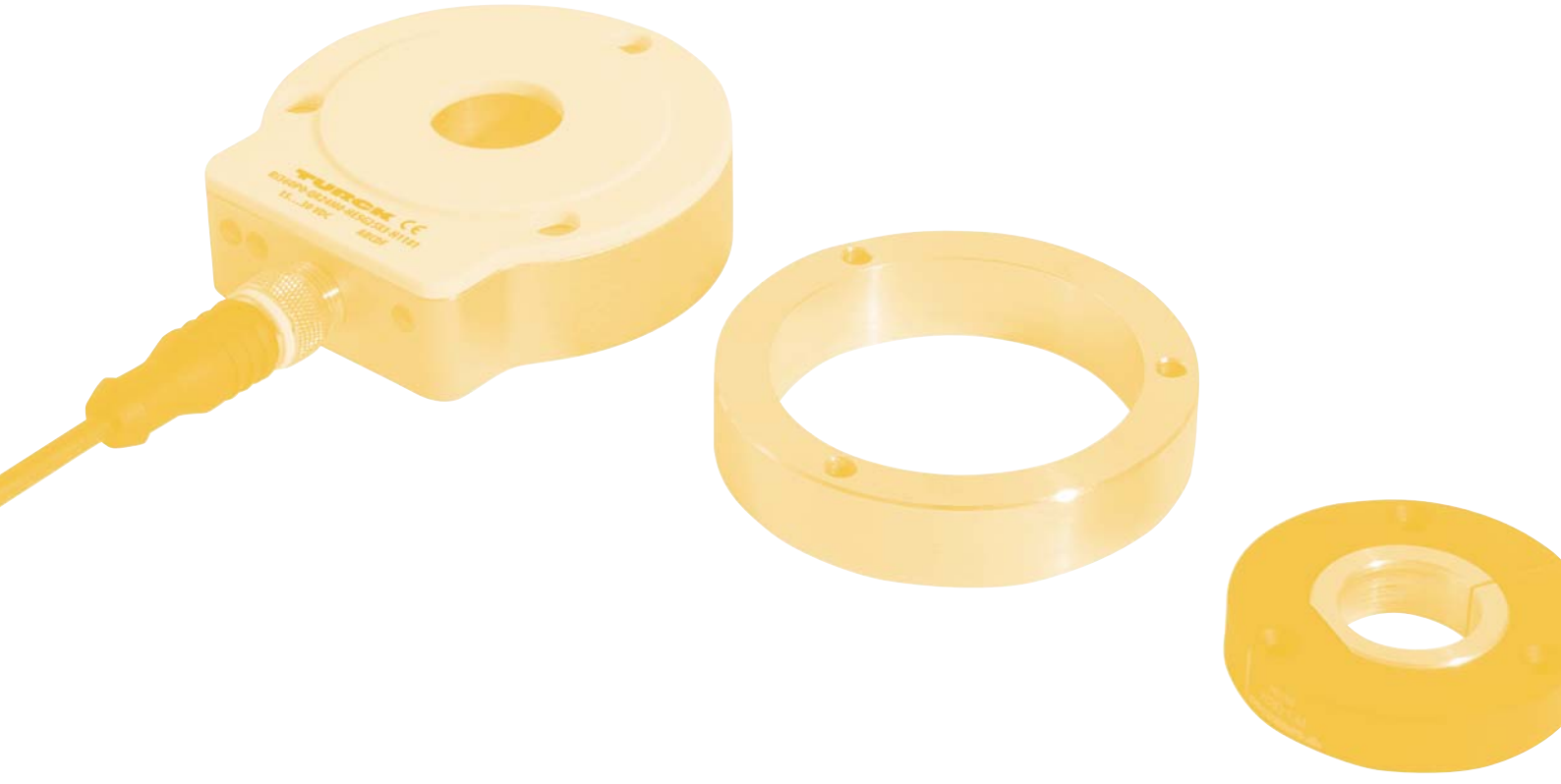
Contents

Industrial Automation



The technology – precise, rugged and safe

Measuring principle

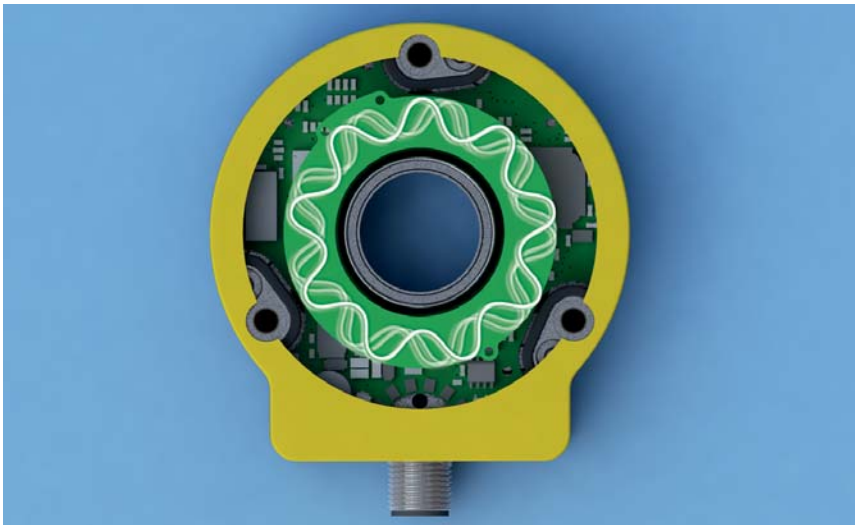
The measuring principle of the new encoders is based on the revolutionary, inductive resonance coupling circuit, which offers considerable benefits compared to optical or magnetic measuring principles. The sensor houses emitter and receiver coil systems that are manufactured as printed circuit coils with exceptional precision. The emitter coils are excited with a high-frequency AC field and form with the positioning element, the so-called resonator, an inductive resonance coupling circuit. This causes the positioning element to be inductively coupled with the receiver coils.

The geometry of the receiver coils is designed so that different voltages are induced in the coils depending on the position of the positioning element, and thus determine the sensor signal supplied. The sensor is provided with a low-precision and a high-precision receiver coil system in order to increase its flexibility and measuring speed. The low-precision receiver coil system locates the positioning element firstly with less accuracy, whilst the high-precision system carries out the fine position measuring.

Electronics and coil geometry

A special coil arrangement ensures that a stable resonance coupling is implemented in a defined distance range, and that the sensor signal does not change if there is any lateral movement or a change in distance.

The signals are evaluated in the internal 32-bit processor and are presented at the output with an exceptionally high resolution. The electronics are implemented on two board levels: The PCB on which the sensor element is positioned is located directly under the active face; the electronic circuit for the signal evaluation on the other hand, is housed one level below it.

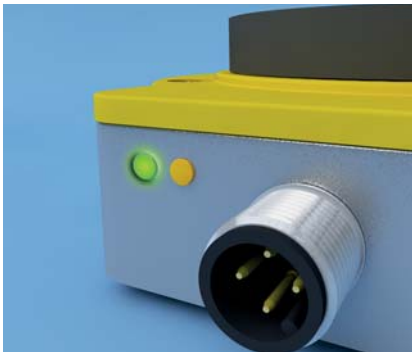


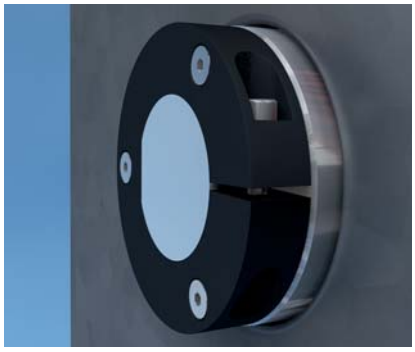
Status LEDs

The encoder independently monitors its operational readiness and indicates this with a green LED. It warns the user of any impending signal loss between the sensor and positioning element via the yellow LED. Faults are indicated via the red LED. The operational status of the sensor is thus easily determined at any time.

Housing and shaft adaption

The housing of the inductive encoder is made of metal, with plastic on the active face. The sensor can be mounted easily from both sides. The positioning element is adapted to the shaft in place by means of a shaft ring supplied. This is available in various diameters from 6 to 20 mm, and 1/8" and 3/8". The positioning element can also be screwed frontally to the shaft and then covered with the supplied blanking plug.

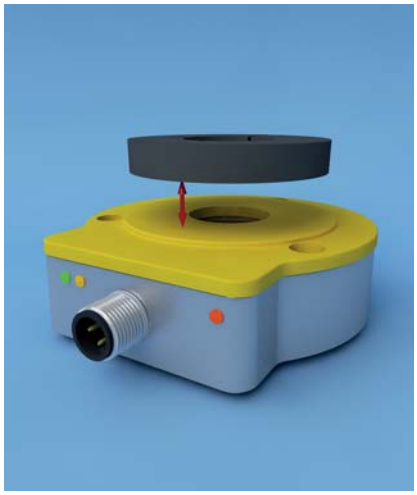




Features

Non-contact rotation measuring

The new measuring process is a completely contactless and wear-free system. Important characteristics such as accuracy, linearity and sealing are thus retained for the entire lifespan of the sensor and guarantee perfect sensor operation at any time.



Rugged and fully sealed housing

The fully encapsulated die-cast metal housing ensures the high mechanical strength of the sensor. The sensor also stands out on account of its excellent resistance to many chemicals and oils. The metal housing is rugged and allows flexible mounting.

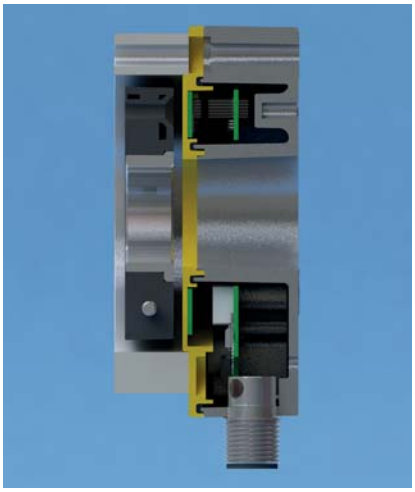
Combined with the comprehensive range of mounting accessories, the sensor can always be mounted in the installation securely, flexibly and simply.

TURCK inductive encoders come in highly sealed housings and offer permanent protection to IP69K/IP67. The devices are also resistant to a number of aggressive ambient media.

Mechanically and electrically wear-free

The major disadvantage of previous encoders is the necessary direct mechanical connection of the rotating shaft that is inherent in their design. The seal of the encoder housing also becomes brittle, cracked and then leaks due to the stress permanently induced by the fast rotating shafts. Penetrating water, dust or sand damage the sensitive sensor circuit and cause downtimes.

The QR24 inductive encoder works without any mechanical coupling into the fully encapsulated sensor housing. This contactless encoder is therefore not only electrically but also mechanically wear-free.



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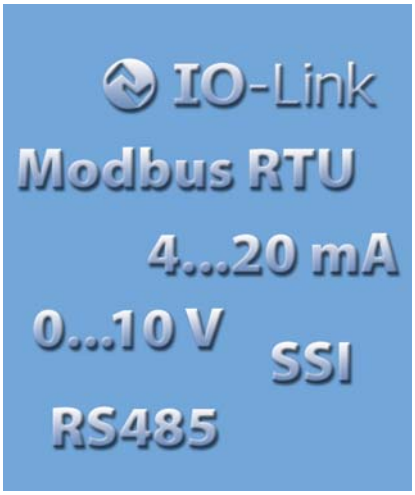
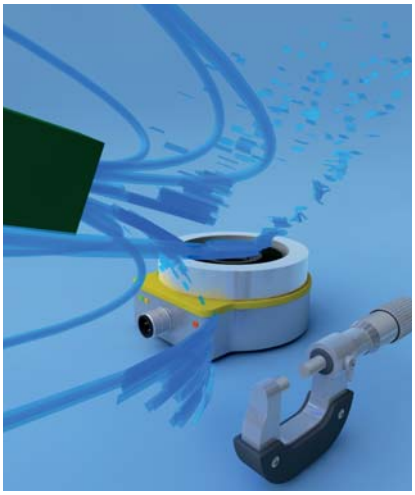
Flexible process connection

Various output types, such as an analog current or voltage output, Mosbus RTU or SSI output, make it possible to carry out the required adaption to the higher-level PLC.

The signal can thus for example be connected simply via the TURCK remote I/O systems to different bus systems. The connection is always implemented with M12 x 1 standard male connectors so that any special connectors are unnecessary. An IO-Link version is also available which enables extensive parametrization.





Maximum precision and immunity

The measuring principle and the system resolution of the new inductive encoders ensure highly precise measuring signals and thus enable a very high linearity and reproducibility. Interference pulses that could affect the output signal, such as from: frequency inverters, large motors, ferrite metals or permanent magnets are not a problem. The encoder operates with a resonator oscillation circuit and is therefore immune to any kind of magnetic field whilst offering an outstanding EMC performance. Mechanical interference is also not a problem as this system operates without a shaft fitted in the sensor unit. Environmental factors such as water, dust or vibration on the shaft that could considerably wear the mechanical components or destroy the electrical circuitry are thus irrelevant.

Flexible accessories, teachability

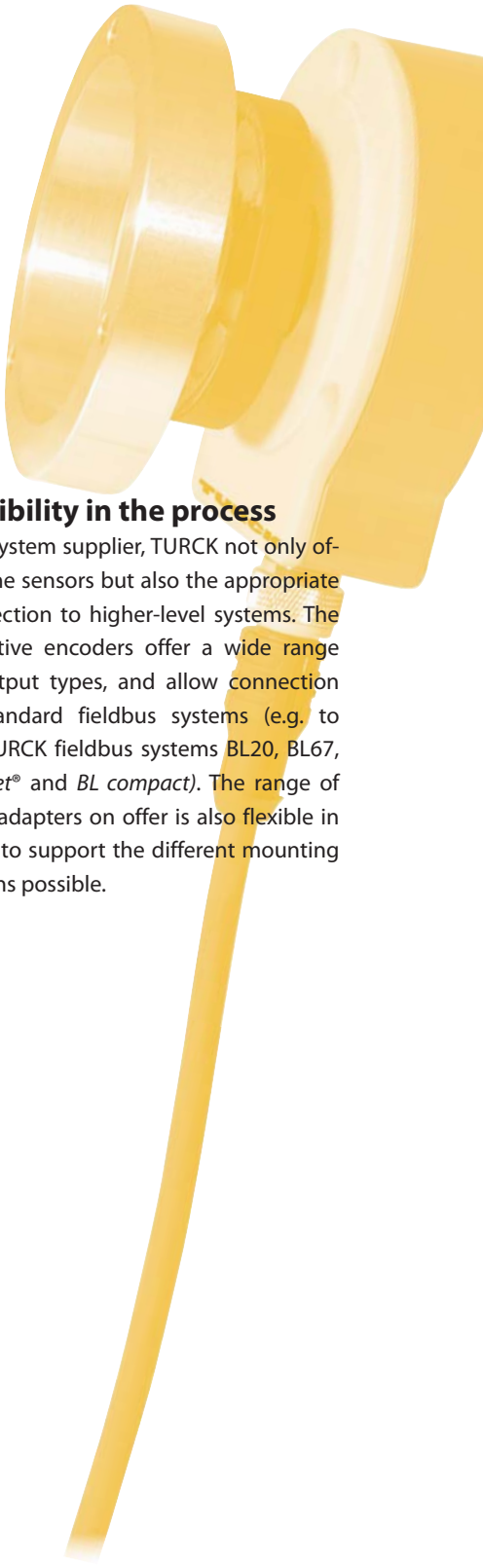
Every application is different. The mechanical components involved, such as the shaft diameter, may be different. The electrical system may require a single-turn or a multiturn signal.

Thanks to its ingenious mechanical concept, the TURCK inductive encoder can be adapted perfectly to any standard shaft by means of different adapter sleeves. The QR 24 encoder series consists of teachable sensors that customers can also adapt electrically in no time to the requirements of the application at hand.

Cost optimization through…

Process safety

The encoder offers reliable operation at any time even in the harshest ambient conditions. The sensor comes with protection to IP69K/IP67 and constantly supplies precise results, even if it is exposed to dust or water. Vibrations and any horizontal or vertical movement of the positioning element do not affect the output signal. The encoder is not affected by magnetic fields (such as caused by electric motors) since the resonant circuit measuring principle provides the sensor with an outstanding EMC performance. Logically implemented state-of-the-art technology has thus been used to ensure fewer downtimes during production.



Flexibility in the process

As a system supplier, TURCK not only offers the sensors but also the appropriate connection to higher-level systems. The inductive encoders offer a wide range of output types, and allow connection to standard fieldbus systems (e.g. to the TURCK fieldbus systems BL20, BL67, *piconet*® and *BL compact)*. The range of shaft adapters on offer is also flexible in order to support the different mounting options possible.

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Standardization

The simple and flexible parametrization enables the sensor to be adapted to the particular requirements of the user, for example, with regard to the SSI bit length and the measuring range for an analog voltage output.

The available shaft adapters make it possible to use the existing shaft in place and for all standard diameters.

The standardization thus makes it possible to achieve a high level of stock availability. TURCK can respond to new requirements within a few days, thus enabling the customer to keep his stock to a minimum. TURCK offers this delivery service worldwide through a large number of subsidiaries and agents. Customers worldwide can therefore benefit from TURCK's manufacturing expertise.

Maintenance free

Unlike conventional optical encoders that fail with time due to the inherent permanent stress on the shaft bearings, the new inductive encoder also operates mechanically contact-free, i.e. wear-free and maintenance-free. LEDs indicate any faults and are clearly visible even from a distance. Status queries can also be implemented in this way. The measuring range can be adjusted easily for new tasks without any major effort required.

Ri-QR24 inductive encoder

Absolute single/multiturn encoder with SSI interface

Product features

- Compact and rugged housing
- SSI output
- 25-bit, Gray coded
- SSI cycle rate: 62.5 KHz…1 MHz
- Single or multiturn mode, data frame length as well as bit coding settable via PACTware™ with programming box USB-2-IOL-0002 and adapter cable
- Default setting: Singleturn Bit 0…15, multiturn Bit 16…21, Status bit 22…24
- Male connector, M12 x 1, 8-pin

LED indication

- **green:** Sensor power supply OK
- **yellow:** Positioning element in measuring range with reduced signal quality (e.g. distance too large), see status Bit 23
- **yellow flashing:** Positioning element not in sensing range, see status Bit 24
- **off:** Positioning element in measuring range

Multiturn errors

- **red:** Position changed during a power loss, see status Bit 22

Ri	360	P1	–	QR24	M1	–	H	E	S	G	25	X3	–	H1	1	8	1

Ri	360	P1	Operating principle	–	QR24	M1	Housing style	–	H	E	S	G	25	X3	Electrical version	–

Positioning element

P0	without positioning element
P1	P1-Ri-QR24
P2	P2-Ri-QR24
P3	P3-Ri-QR24
P4	P4-Ri-QR24
P5	P5-Ri-QR24
P6	P6-Ri-QR24
P7	P7-Ri-QR24

Measuring range

360 360°

Operating principle

Ri Rotatory inductive

Mounting element

M0	without mounting element
M1	M1-QR24

Housing style

QR24

Number of LEDs

X3 3 x LEDs

Number of bits

25 Number of bits (default setting, other values can be set by the customer)

Code

G Gray (default setting, binary can be set by the customer)

SSI interface

S SSI interface

Resolution

E Higher resolution

Scan rate

H Higher scan rate

H1	1	8	1	Electrical connection

Assignment (digit 5)

1 Standard assignment

Number of contacts (digit 4)

8 8-pin M12 x 1

Connector type (digit 3)

1 straight

Connector type (digit 1 and 2)

H1 Male connector M12 x 1

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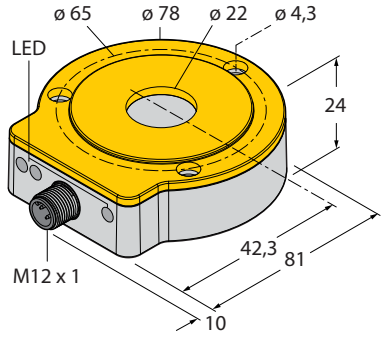
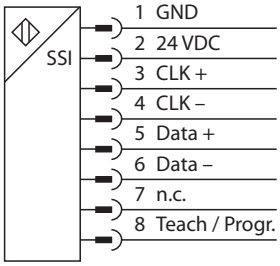


Wiring diagram



Measuring range	
Measuring range	0…360° Single or multiturn mode
System	
Resolution	16-bit
Repetition accuracy	0.01 %
Linearity tolerance	≤ 0.05 % full scale
Temperature drift	≤ ± 0.003 %/K
Ambient temperature	-25…+85 °C
Electrical data	
Operating voltage	15…30 VDC
Ripple	≤ 10 % U_{pp}
Rated insulation voltage	≤ 0.5 kV
Reverse polarity protection	yes (power supply)
Output function	eight-wire, SSi, 25-bit, Gray coded
Process data range	can be set
Diagnostic bits	Bit 22: Position changed during a power loss Bit 23: Positioning element is in the measuring range, reduced signal quality (e.g. distance too large) Bit 24: Positioning element is outside of measuring range Data telegram as multiturn and singleturn process data or error bits can be set
Scan rate	5000 Hz/the scan rate of the sensor depends on the SSI cycle time of the master. It is 1 to 5 KHz (signal run time 200 µs) in synchronized operation
Current consumption	< 100 mA
Housing	
Dimensions	81 x 78 x 24 mm
Housing material	Metal/plastic, ZnAlCu1/PBT-GF30-V0
Connection	Male connector, M12 x 1
Vibration resistance	EN 60068-2-6, 55 Hz
Shock resistance	EN 60068-2-27, 30 g
Degree of protection	IP67/IP69K
MTTF	138 years to SN 29500 (Ed. 99) 40 °C
LEDs	
Operating voltage indication	LED green
Measuring range indication	LED, yellow, yellow flashing
Fault indication	LED red
Miscellaneous	
Included in scope of supply	Mounting aid MT-QR24, RA0-QR24 (alternative to reducing bush)

Ordering example

Ri	360	P1	–	QR24	M1	–	H	E	SG25	X3	–	H1181
Rotary inductive encoder	Measuring range 360°	Positioning element P1-Ri-QR24		Housing style QR24	with mounting element M1-QR24		Higher scan rate	Higher resolution	SSI output, Gray coded 25-bit	3 LEDs		Connection via male connector, M12 x 1, 8-pin

Ri-QR24 inductive encoder

Absolute single/multiturn encoder with Modbus RTU

Product features

- Compact and rugged housing
- Versatile mounting possibilities
- 16-bit singleturn, 16-bit multiturn
- Zero point and direction adjustable via Easy Teach
- Address assignment via PACTware™ with programming box USB-2-IOL-0002 and adapter cable
- Immune to electromagnetic interference
- 15…30 VDC
- Male connector, M12 x 1, 5-pin
- Modbus RTU, RS485

LED indication

- **green:** Sensor power supply OK
- **yellow:** Positioning element is in the measuring range, reduced signal quality (e.g. distance too large)
- **yellow flashing:** Positioning element is outside of sensing range
- **off:** Positioning element in measuring range

Multiturn faults

- **red:** Position changed during a power loss

Ri	360	P1	–	QR24	M1	–	MRTU	X3	–	H1	1	5	1

Ri	360	P1	Operating principle	–	QR24	M1	Housing style	–	MRTU	X3	Electrical version	–

Positioning element
- **P0** without positioning element
- **P1** P1-Ri-QR24
- **P2** P2-Ri-QR24
- **P3** P3-Ri-QR24
- **P4** P4-Ri-QR24
- **P5** P5-Ri-QR24
- **P6** P6-Ri-QR24
- **P7** P7-Ri-QR24

Measuring range
- **360** 360°

Operating principle
- **Ri** Rotatory inductive

Mounting element
- **M0** without mounting element
- **M1** M1-QR24

Housing style
- **QR24**

Number of LEDs
- **X3** 3 x LEDs

Interface
- **MRTU** Modbus RTU

H1	1	5	1	Electrical connection

Assignment (digit 5)
- **1** Standard assignment

Number of contacts (digit 4)
- **5** 5-pin M12 x 1

Connector type (digit 3)
- **1** straight

Connector type (digit 1 and 2)
- **H1** Male connector M12 x 1

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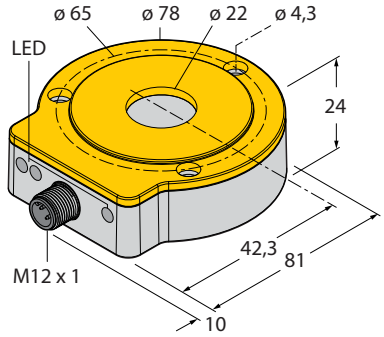
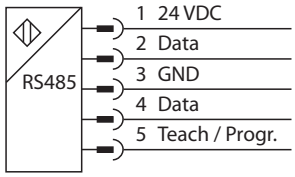


Wiring diagram



Measuring range	
Measuring range	0…360° Single or multiturn mode
System	
Resolution	16-bit/16-bit
Repetition accuracy	0.01 %
Linearity tolerance	≤ 0.05 % full scale
Temperature drift	≤ ± 0.003 %/K
Ambient temperature	-25…+85 °C
Electrical data	
Operating voltage	15…30 VDC
Ripple	≤ 10 % U_{pp}
Rated insulation voltage	≤ 0.5 kV
Reverse polarity protection	yes (power supply)
Output function	Five-wire, RS485, Modbus RTU
Scan rate	5000 Hz
Current consumption	< 100 mA
Housing	
Dimensions	81 x 78 x 24 mm
Housing material	Metal/plastic, ZnAlCu1/PBT-GF30-V0
Connection	Male connector, M12 x 1
Vibration resistance	EN 60068-2-6, 55 Hz
Shock resistance	EN 60068-2-27, 30 g
Degree of protection	IP67/IP69K
MTTF	138 years to SN 29500 (Ed. 99) 40 °C
LEDs	
Operating voltage indication	LED green
Measuring range indication	LED, yellow, yellow flashing
Fault indication	LED red
Others	
Included in scope of supply	Mounting aid MT-QR24, RA0-QR24 (alternative to reducing bush)

expected availability Q3/2013

Ordering example

Ri	360	P1	–	QR24	M1	–	MRTU	X3	–	H1151
Rotary inductive encoder	Measuring range 360°	Positioning element P1-Ri-QR24		Housing style QR24	with M1-QR24 mounting element		Modbus RTU interface	3 LEDs		Connection via male connector, M12 x 1, 5-pin

Ri-QR24 inductive encoder

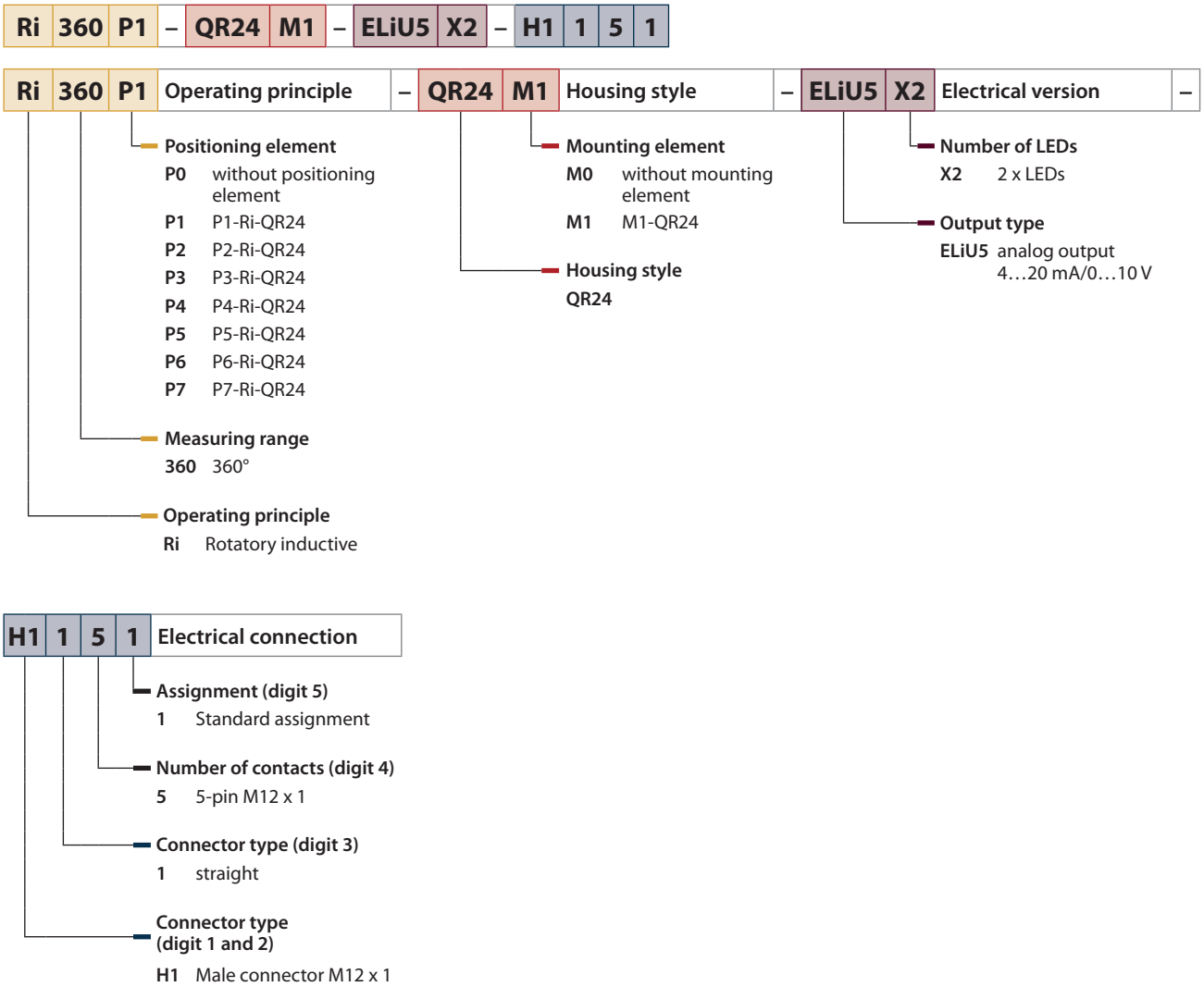
Absolute singleturn encoder with programmable analog output (U/I)

Product features

- Compact and rugged housing
- Versatile mounting possibilities
- Immune to electromagnetic interference
- Programmable measuring range
- 16-bit resolution
- 15…30 VDC
- analog output 0…10 V and 4…20 mA
- Male connector, M12 x 1, 5-pin

LED indication

- **green:** Sensor power supply OK
- **yellow:** Positioning element is in the measuring range, reduced signal quality (e.g. distance too large)
- **yellow flashing:** Positioning element is outside of sensing range
- **off:** Positioning element in measuring range



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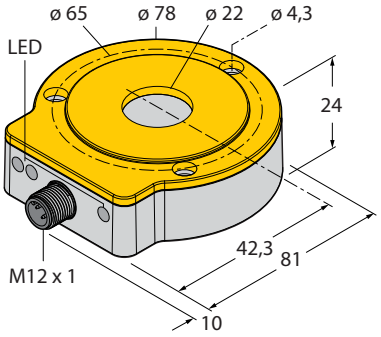
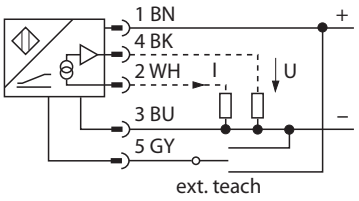


Wiring diagram



Measuring range	
Measuring range	0…360°
System	
Resolution	16-bit
Repetition accuracy	0.01 %
Linearity tolerance	≤ 0.05 % full scale
Temperature drift	≤ ± 0.004 %/K
Ambient temperature	-25…+85 °C
Electrical data	
Operating voltage	15…30 VDC
Ripple	≤ 10 % U_{pp}
Rated insulation voltage	≤ 0.5 kV
Reverse polarity protection	Yes
Output function	Five-wire, analog output
Voltage output	0…10 V
Current output	4…20 mA
Load resistance voltage output	≥ 4.7 kΩ
Load resistance current output	≤ 0.4 kΩ
Scan rate	5000 Hz
Current consumption	< 100 mA
Housing	
Dimensions	81 x 78 x 24 mm
Housing material	Metal/plastic, ZnAlCu1/PBT-GF30-V0
Connection	Male connector, M12 x 1
Vibration resistance	EN 60068-2-6, 55 Hz
Shock resistance	EN 60068-2-27, 30 g
Degree of protection	IP67/IP69K
MTTF	138 years to SN 29500 (Ed. 99) 40 °C
LEDs	
Operating voltage indication	LED green
Measuring range indication	LED, yellow, yellow flashing
Others	
Included in scope of supply	Mounting aid MT-QR24, RA0-QR24 (alternative to reducing bush)

expected availability Q4/2013

Ordering example

Ri	360	P1	–	QR24	M1	–	ELiU5	X2	–	H1151
Rotary inductive encoder	Measuring range 360°	Positioning element P1-Ri-QR24		Housing style QR24	with mounting element M1-QR24		Analog output 4…20 mA 0…10 V	2 LEDs		Connection via male connector, M12 x 1, 5-pin

Ri-QR24 inductive encoder

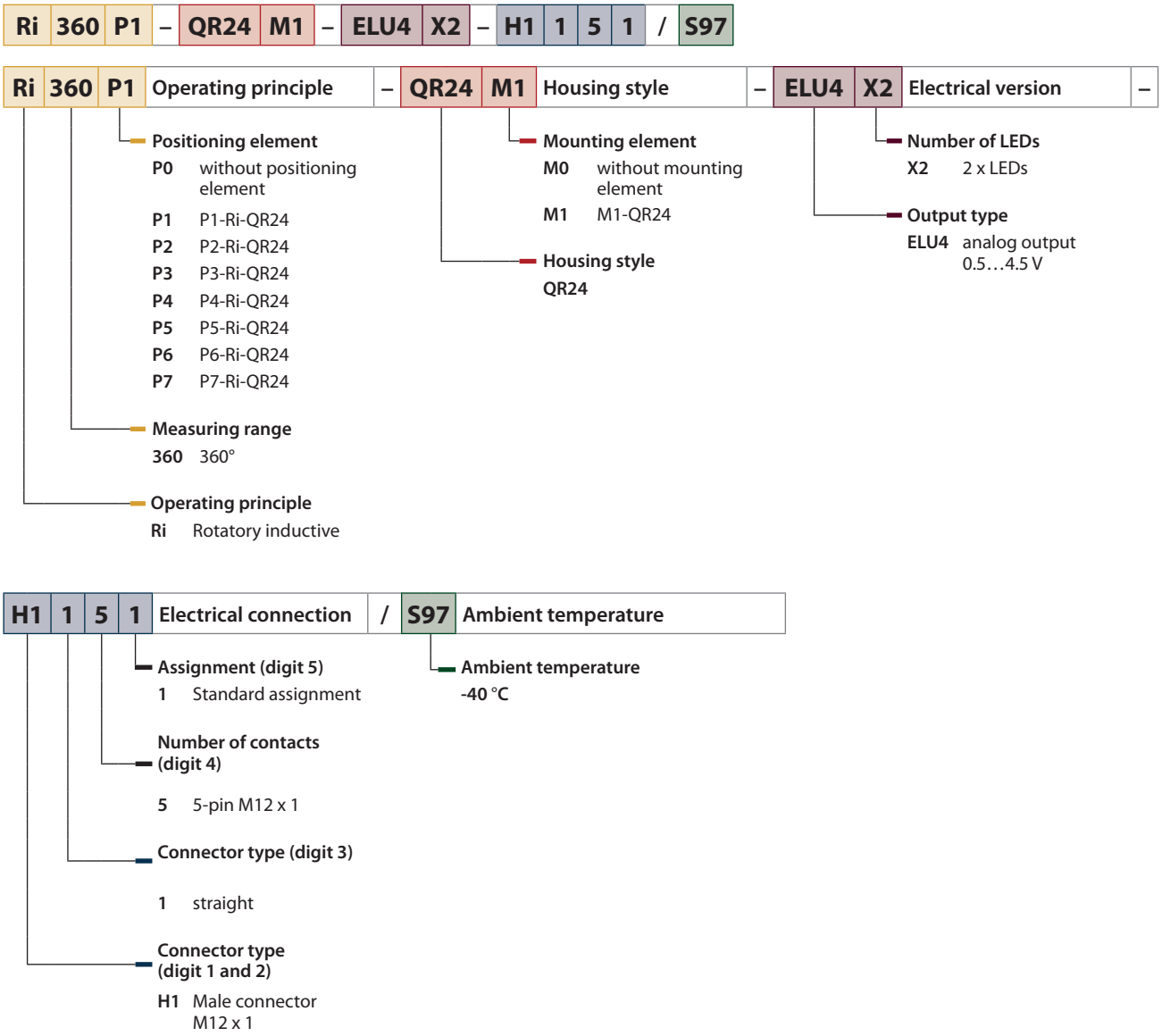
Absolute singleturn encoder with programmable analog output (U), for mobile machines

Product features

- Compact and rugged housing
- Versatile mounting possibilities
- Immune to electromagnetic interference
- Programmable measuring range
- 16-bit resolution
- 8…30 VDC
- analog output 0.5…4.5 V
- Male connector, M12 x 1
- Temperature range -40 … 85 °C

LED indication

- **green:** Sensor power supply OK
- **yellow:** Positioning element is in the measuring range, reduced signal quality (e.g. distance too large)
- **yellow flashing:** Positioning element is outside of sensing range
- **off:** Positioning element in measuring range



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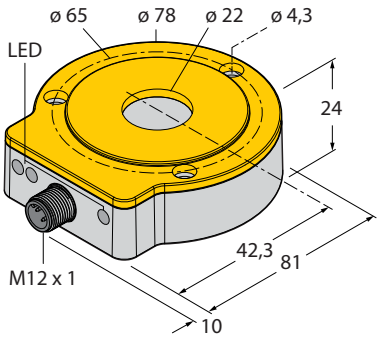

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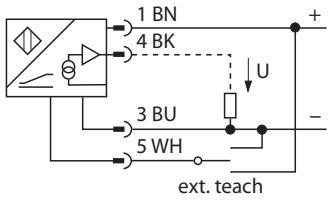

Measuring range	
Measuring range	0…360°
System	
Resolution	16-bit
Repetition accuracy	0.01 %
Linearity tolerance	≤ 0.05 % full scale
Temperature drift	≤ ± 0.004 %/K
Ambient temperature	-40 °C…+85 °C
Electrical data	
Operating voltage	8…30 VDC
Ripple	≤ 10 % U_{pp}
Rated insulation voltage	≤ 0.5 kV
Output function	Four-wire, analog output 0.5…4.5 V
Voltage output	≥ 4.7 kΩ
Load resistance voltage output	5000 Hz
Scan rate	< 100 mA
Current consumption	
Housing	
Dimensions	81 x 78 x 24 mm
Housing material	Metal/plastic, ZnAlCu1/PBT-GF30-V0
Connection	Male connector, M12 x 1
Vibration resistance	EN 60068-2-6, 55 Hz
Shock resistance	EN 60068-2-27, 30 g
Degree of protection	IP67/IP69K
MTTF	138 years to SN 29500 (Ed. 99) 40 °C
LEDs	
Operating voltage indication	LED green
Measuring range indication	LED, yellow, yellow flashing
Others	
Included in scope of supply	Mounting aid MT-QR24, RA0-QR24 (alternative to reducing bush)

expected availability Q4/2013

Ordering example

Ri	360	P1	–	QR24	M1	–	ELU4	X2	–	H1151
Rotary inductive encoder	Measuring range 360°	Positioning element P1-Ri-QR24		Housing style QR24	with mounting element M1-QR24		Analog output 0.5…4.5 V	2 LEDs		Connection via male connector, M12 x 1, 5-pin

Ri-QR24 inductive encoder

Absolute single/multiturn Encoder with programmable analog/digital output (U/I/PNP/NPN), IO-Link compatible

Product features

- Compact and rugged housing
- Versatile mounting possibilities
- Programmable measuring range, multiturn/single-turn mode
- All functions can be set via IO-Link/ PACTware™
- analog output, configurable NC/NO switch functions as NPN or PNP version
- Process value in 16-bit IO-Link telegram
- Male connector, M12 x 1, 5-pin

Measuring range indication via LED

- **green:** Sensor power supply OK
- **yellow:** Positioning element is in the measuring range, reduced signal quality (e.g. distance too large)
- **yellow flashing:** Positioning element is outside of sensing range
- **off:** Positioning element in measuring range

Multiturn faults

- **red:** Position changed during a power loss

Ri	360	P1	–	QR24	M1	–	ELiUPN8	X4	–	H1	1	5	1

Ri	360	P1	Operating principle	–	QR24	M1	Housing style	–	ELiUPN8	X4	Electrical version	–

Positioning element

P0	without positioning element
P1	P1-Ri-QR24
P2	P2-Ri-QR24
P3	P3-Ri-QR24
P4	P4-Ri-QR24
P5	P5-Ri-QR24
P6	P6-Ri-QR24
P7	P7-Ri-QR24

Measuring range

360 360°

Operating principle

Ri Rotatory inductive

Mounting element

M0	without mounting element
M1	M1-QR24

Housing style

QR24

Number of LEDs

X4 4 x LEDs

Output type

ELi	IO-Link capable,
UPN8	analog output, switch output

H1	1	5	1	Electrical connection

Assignment (digit 5)

1 Standard assignment

Number of contacts (digit 4)

5 5-pin M12 x 1

Connector type (digit 3)

1 straight

Connector type (digit 1 and 2)

H1 Male connector M12 x 1

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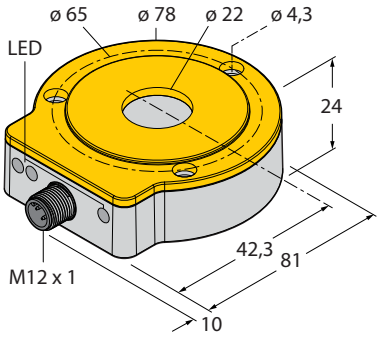
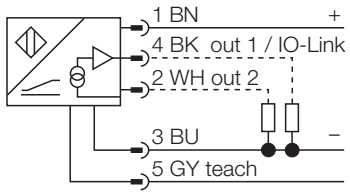


Wiring diagram



Measuring range	
Measuring range	0…360° Single or multiturn mode
System	
Resolution	16-bit
Repetition accuracy	0.01 %
Linearity tolerance	≤ 0.05 % full scale
Temperature drift	≤ ± 0.004 %/K
Ambient temperature	-25…+85 °C
Electrical data	
Operating voltage	15…30 VDC
Ripple	≤ 10 % U_{pp}
Rated insulation voltage	≤ 0.5 kV
Reverse polarity protection	yes, full
Output function	Five-wire, NO/NC, PNP/NPN, analog output
Voltage output	0…10 V
Current output	4…20 mA
Load resistance voltage output	≥ 4.7 kΩ
Load resistance current output	≤ 0.4 kΩ
Short-circuit protection	Yes/cyclic
Scan rate	5000 Hz
Current consumption	< 100 mA
Housing	
Dimensions	81 x 78 x 24 mm
Housing material	Metal/plastic, ZnAlCu1/PBT-GF30-V0
Connection	Male connector, M12 x 1
Vibration resistance	EN 60068-2-6, 55 Hz
Shock resistance	EN 60068-2-27, 30 g
Degree of protection	IP67/IP69K
MTTF	138 years to SN 29500 (Ed. 99) 40 °C
LEDs	
Operating voltage indication	LED green
Switching state indication	LED yellow
Measuring range indication	LED yellow, yellow flashing
Fault indication	LED red
Others	
Included in scope of supply	Mounting aid MT-QR24, RA0-QR24 (alternative to reducing bush)

expected availability Q4/2013

Ordering example

Ri	360	P1	–	QR24	M1	–	ELiUPN8	X4	–	H1151
Rotary inductive encoder	Measuring range 360°	Positioning element P1-Ri-QR24		Housing style QR24	with mounting element M1-QR24		Output type IO-Link compatible analog output switching output	4 LEDs		Connection via male connector, M12 x 1, 5-pin

Accessories for fieldbus connections

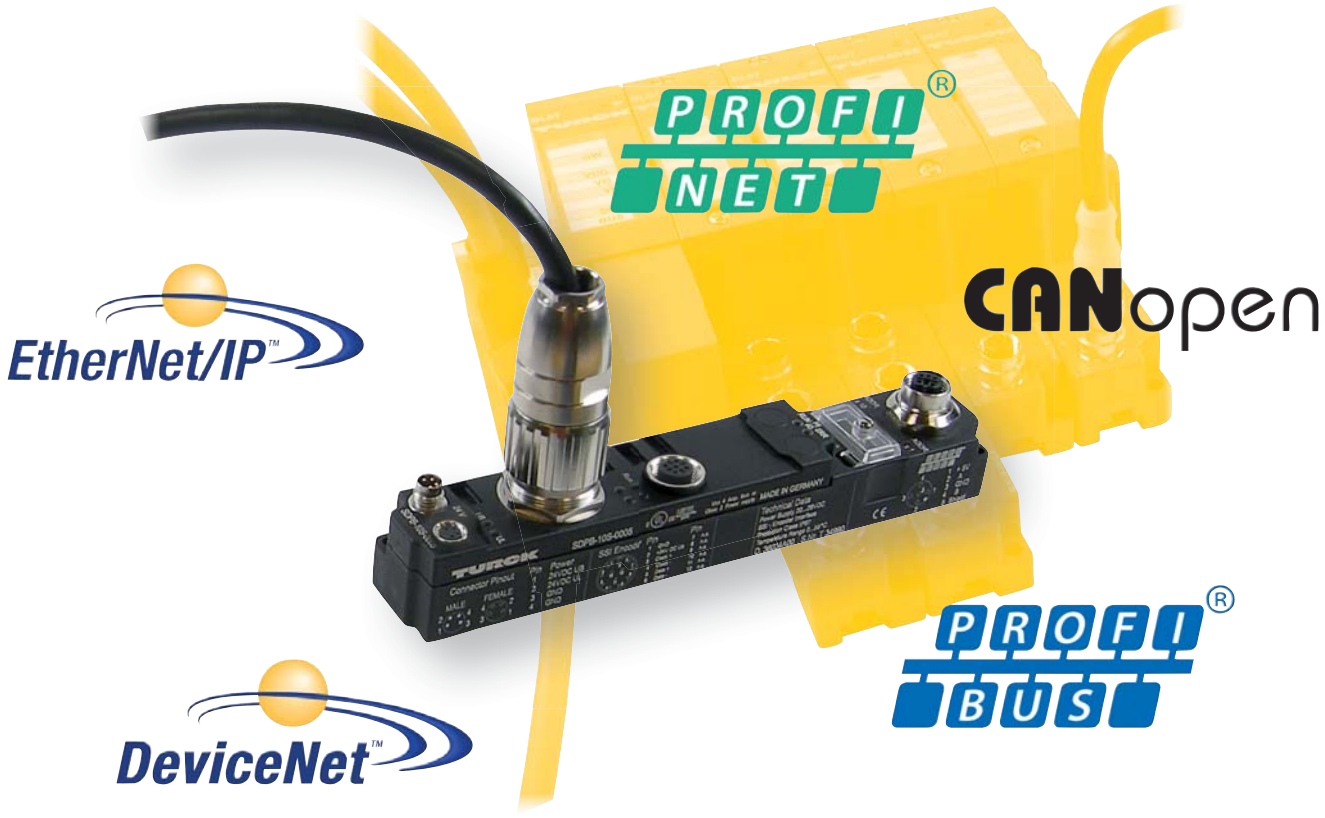
The version with the SSI interface is suitable as an encoder for all fieldbus devices

The encoders are often required to be connected directly to the fieldbus that communicates with the higher-level controller. This enables the position feedback signals of the sensor to be transferred directly to the fieldbus system (e.g. to PROFIBUS-DP, DeviceNet™, CANopen or to Ethernet-based protocols) – this consequently eliminates the need for analog input modules.

In order to offer maximum flexibility for connecting sensors, TURCK also provides modular solutions, i.e. linear position sensor, extension cable and fieldbus modules are available as separate components. The TURCK sensors are therefore considerably more compact than the large sensors with integrated fieldbus connection. This eliminates any space problems from the start.

TURCK supplies fieldbus modules as remote I/O systems both in IP20 for the control cabinet (BL20) as well as in IP67 for harsh ambient conditions (BL67). The devices can be programmed with CODESYS (IEC 61131) for signal preprocessing or also for stand-alone solutions (for relieving the load on the bus and higher-level controller). If the remote I/O systems are too large, TURCK's exceptionally space saving *piconet*® fieldbus system and *BLcompact* systems offer the optimum solution – with highly rugged modules for direct field installation.

- All standard fieldbus systems
- Very simple changing between fieldbus systems
- Modular principle
- High flexibility
- Sensor independent of fieldbus system
- Exceptionally space saving



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Designation	Description
***piconet*® – IP67 protection – exceptionally compact**	
SDPB-10S-0005	PROFIBUS-DP, M23, 12-pin
SDNB-10S-0005	DeviceNet™, M23, 12-pin
SCOB-10S-0005	CANopen, M23, 12-pin
E-RKS8T-264-1-CSWM12/S3085	M12 extension cable, 8-pin, to M23, 12-pin, 1 m for connecting linear position sensors with SSI output to BL67 and *piconet*® fieldbus stations
***BL compact* – IP67 protection – exceptionally rugged**	
BLCDP-1M12MT-1SSI	PROFIBUS-DP, M12, 8-pin
BLCDN-1M12S-1SSI	DeviceNet™, M12, 8-pin
E-RKC8T-264-2-RSC8T	M12 connection cable, 8-pin, 2 m connection of linear position sensors with SSI output to BL67 and *BL compact* fieldbus stations
BL67 – remote I/O system with protection to IP67	
BL67-GW-DPV1	PROFIBUS-DP gateway
BL67-PG-DP	PROFIBUS-DP gateway, programmable
BL67-GW-DN	Gateway DeviceNet™
BL67-GW-CO	Gateway CANopen
BL67-GW-EN	Gateway Ethernet Modbus TCP
BL67-PG-EN	Ethernet Modbus TCP gateway, programmable
BL67-GW-EN-PN	Ethernet PROFINET IO gateway
BL67-1SSI	Communication module
BL67-B-1M12-8	M12 connection module, 8-pin
BL67-B-1M23	M23 connection module, 12-pin
E-RKC8T-264-2-RSC8T	M12 connection cable, 8-pin, 2 m connection of linear position sensors with SSI output to BL67 and *BL compact* fieldbus stations
E-RKS8T-264-1-CSWM12/S3085	M12 extension cable, 8-pin, to M23, 12-pin, 1 m for connecting linear position sensors with SSI output to BL67 and *piconet*® fieldbus stations
BL20 – remote I/O system with protection to IP20	
BL20-GW-DPV1	PROFIBUS-DP gateway
BL20-GWBR-DNET	DeviceNet™ gateway
BL20-GWBR-CANOPEN	CANopen gateway
BL20-GW-EN	Ethernet Modbus TCP gateway
BL20-PG-EN	Ethernet Modbus TCP gateway, programmable
BL20-GW-PG-EN	Ethernet PROFINET IO gateway
BL20-1SSI	Communication module
BL20-S4T-SBBS	Connection module, tension spring connection
E-RKC8T-264-2	M12 extension cable, 8-pin, 2 m open cable end for connecting linear position sensors with SSI output to BL20 fieldbus stations

BL20 example configuration

The following components are required to connect a linear position sensor to a PROFIBUS system via a BL20 station:

1 x PROFIBUS gateway	1 x communication module	1 x connection module	1 x connection cable
BL20-GW-DPV1	BL20-1SSI	BL20-S4T-SBBS	E-RKC-8T-264-2

piconet® example configuration

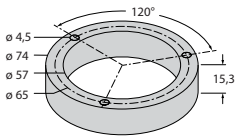
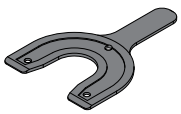
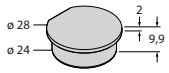
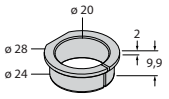
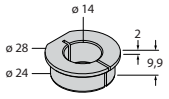
The following components are required to connect a linear position sensor to a PROFIBUS system via a *piconet*® station:

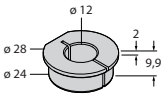
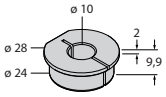
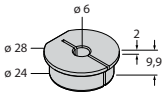
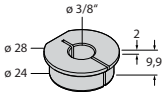
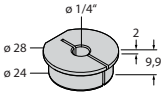
1 x PROFIBUS compact station	1 x connection cable
SDPB-10S-0005	E-RKS-8T-264-1-CSWM12/S3085

Connection and mounting accessories

	Adapter cable	
	Type	**Description**
	RKC5.301T-1,5-RSC4T/TX320	Adapter cable for connecting the Modbus RTU sensor to the parameter unit USB-2-IOL-0002, PUR
	RKC8.302T-1,5-RSC4T/TX320	Adapter cable for connecting the SSI sensor to the parameter unit USB-2-IOL-0002, PUR
	Connection cable for series with analog output	
	Type	**Description**
	RKS4,5T-2/TXL	Connection cable M12, 5-pin, shielded, 2 m with open end, PUR
	Connection cable for series with SSI interface	
	Type	**Description**
	E-RKC8T-264-2-RSC8T	M12 extension cable, 8-pin, 2 m connection of endocers with SSI output to BL67 and *BL compact* fieldbus stations
	E-RKC8T-264-2	M12 extension cable, 8-pin, 2 m open cable end for connecting encoders with SSI output to BL20 fieldbus stations
	E-RKS8T-264-1-CSWM12/S3085	M12 extension cable, 8-pin, to M23, 12-pin, 1 m for connecting endocers with SSI output to BL67 and *piconet*® fieldbus stations

An extensive range of accessories is available for mounting the sensor. To ensure maximum flexibility, the right mounting accessories are available for all shaft diameters.

Dimension drawing	Type	Description
	M1-QR24	Alu protective unit
	MT-QR24	Fork-shaped mounting aid
	RA0-QR24	Blanking plug
	RA1-QR24	Reducing bush 20 mm
	RA2-QR24	Reducing bush 14 mm

Dimension drawing	Type	Description
	RA3-QR24	Reducing bush 12 mm
	RA4-QR24	Reducing bush 10 mm
	RA5-QR24	Reducing bush 6 mm
	RA6-QR24	Reducing unit 3/8"
	RA7-QR24	Reducing bush 1/4"

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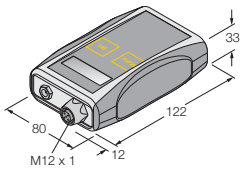
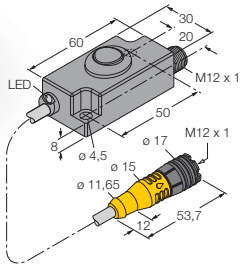
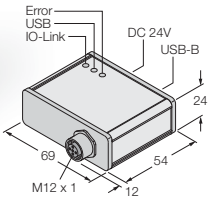
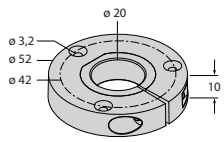
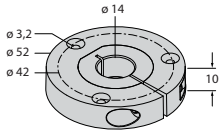
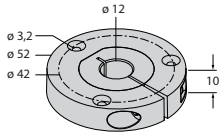
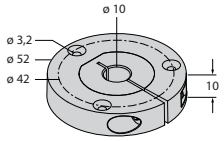
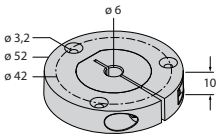
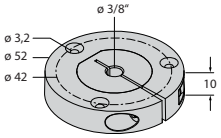
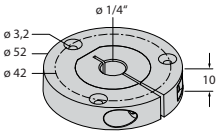
Function accessories

	Dimension drawing	Type	Description
		TB4	analog test box; Test box for sensors with analog or switch output; incl. batteries
		TX1-Q20L60	Teach adapter for programming the measuring range of inductive encoders
		TX2-Q20L60	only for Ri360PO-QR24-HESG25X3-H1181
		USB-2-IOL-0002	IO-Link master with integrated USB interface for setting the IO-Link-capable encoders via a PC

Dimension drawing	Type	Description
	P1-Ri-QR24	Positioning element with 20 mm reducing bush
	P2-Ri-QR24	Positioning element with 14 mm reducing bush
	P3-Ri-QR24	Positioning element with 12 mm reducing bush
	P4-Ri-QR24	Positioning element with 10 mm reducing bush

Dimension drawing	Type	Description
	P5-Ri-QR24	Positioning element with 6 mm reducing bush
	P6-Ri-QR24	Positioning element with 3/8" reducing bush
	P7-Ri-QR24	Positioning element with 1/4" reducing bush

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