TYPE OVERVIEW

General data

Operating voltage U_B	15...30 VDC
Repeat accuracy	≤ 1 %
	≤ 0.5 % after 30 minute warm-up
Temperature drift	≤ 0.06 %/ °C
Ambient temperature	-10...+70 °C
Measuring range	A…B

Protective circuitries

Short-circuit protection
Reverse-polarity protection
Wire-break protection

Output types:

Voltage output, 0 ...10 V or 2 ... 10 V
Current output, 0 ... 20 mA or 4 ... 20 mA
Frequency output, 1 ... 10 kHz
Additional adjustable switching output, PNP
Current output, 4 ... 20 mA, passive (2-wire)
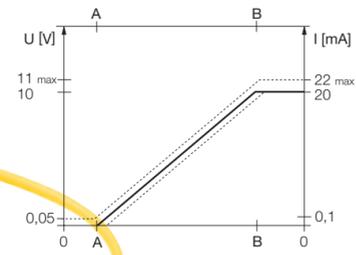
Typical curve of TURCK analogue sensors with linear output signal

Sensor	Measuring range [mm]		
	Linear output signal		**non-linear output signal**
	Standard	**analog+**	
Threaded barrel/ smooth barrel			
Ø 4*/M5 x 0,5*	–	–	1,5 b
Ø 6,5/M8 x 1	–	1b	–
M12	1,5 b/3,5 nb	2,5 b	–
M18	2 b/4 nb	4 b/6 nb	–
M30	5 b/10 nb	8 b	–

*Amplifier electronics integrated in the connector housing
(b = flush mounting, nb = non-flush mounting)

Sensors in threaded and smooth barrels

Sensor	Measuring range [mm]	
	Linear output signal	
	Standard	**analog+**
Rectangular, compact		
Q08, 32 x 20 x 8 mm	3 b	–
Q14, 52 x 30 14 mm	5 b	–
Q20, 68 x 40 x 20 mm	7 b	–
Q80, 80 x 80 x 40 mm	–	40 nb
Rectangular, variable		
CP/CK40, 40 x 40 mm	7 b	20 nb

(b = flush mounting, nb = non-flush mounting)

Sensors in rectangular housings

Ring sensor, compact				
Sensor	**Meansuring range [mm Ø]**			
	Ring Ø	**St37**	**VA**	**NF-Metalle**
Q14, 52 x 30 x 14 mm	20 mm	1 ...10	2 ..17	4 ... 19

15 ... 30 VDC supply voltage, 0 ... 10 V output
cable or connector versions

Ring sensors
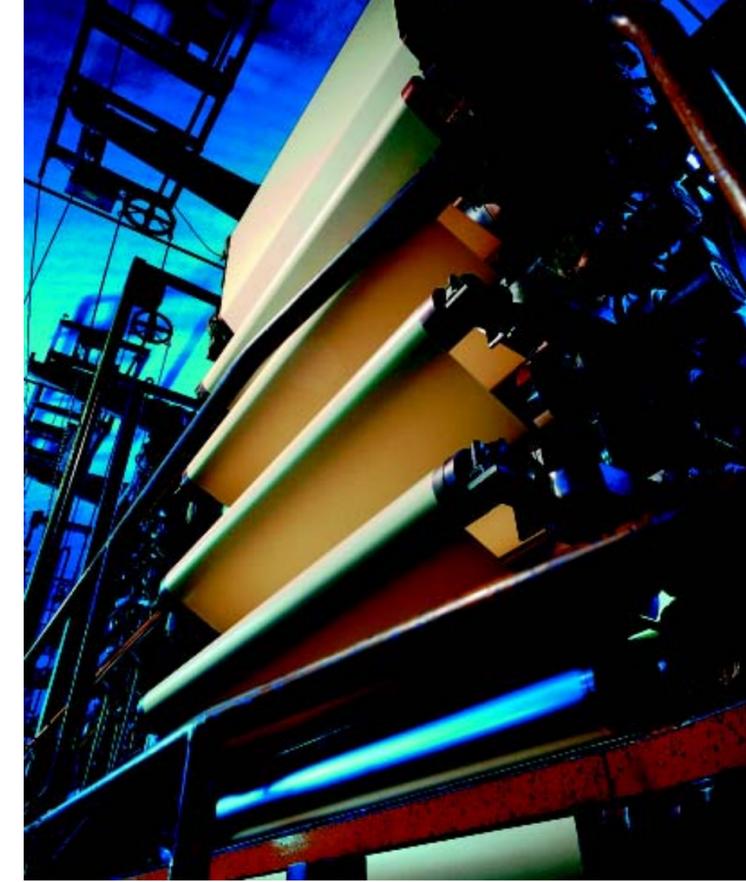
TURCK

Industrial Automation
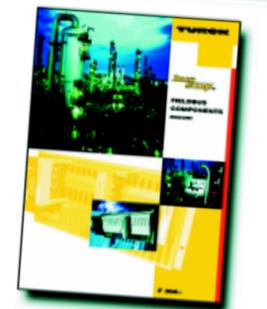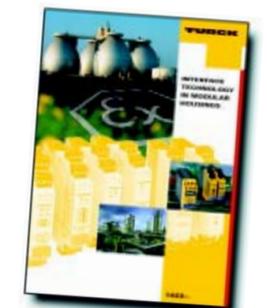
INDUCTIVE ANALOG SENSORS

Analog sensors

Inductive sensors with analog output for simple measuring and control tasks provide a current or voltage signal which is proportional to the target's distance. TURCK's analog sensors provide a linear output signal relative to the distance between the target and the sensor's active face over the entire measuring range.

When monitoring **winding/ unwinding procedures,** the analog sensor measures the roller's thickness and converts this value directly into a proportional current or voltage signal.

Workpieces of **different shape and size** and of **ferritic or non-ferritic materials** will induce the sensor to generate a specific output signal upon attenuation, depending on the typical characteristics and shape of the workpiece. Thus it is possible to distinguish between different kinds of materials.

Further applications suited to analog sensing are for example:

- thickness, gap or distance measurements
- band eccentricity measurements
- band width measurements
- positioning
- positioning control
- absolute position or angular deviation control

That's exactly why TURCK's analog sensors are used in many applications requiring more than simple digital positioning control.

In **tensile stress control applications,** in which wire tension is to be monitored, a wire is lead over an elastically supported roller which attenuates the analog sensor. The extent of deflection of the roller depends on the wire's tension. The drive system is controlled via the signal of the analog sensor to ensure that the tensile stress of the wire remains within the specified limits.

Analog sensors made by TURCK provide optimum performance in all respects. They have outstanding properties such as:

- high accuracy
- large measuring ranges
- current and voltage outputs
- large variety of housings
- excellent EMC protection
- short-circuit and reverse-polarity protection
- all connection types

All these features ensure convenient handling and simple application, quite similar to a digital sensor!


The known and proven TURCK line of analog sensors has grown with the addition of new types, series ***analog+*** . The measuring range of these sensors has once again been extended, so that they are particularly useful in applications where large distances have to be detected and expressed by analogue signals.

However, if the application requires detection of minimal motion or deviation, the standard range of analog sensors is even more suitable. Their linearity and accuracy is even better due to the lower upper range value.
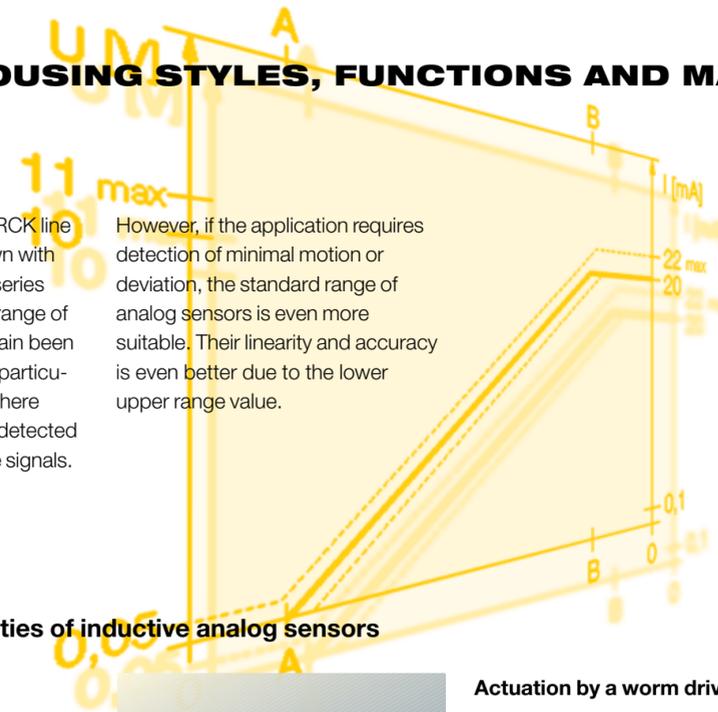
Application possibilities of inductive analog sensors

Plane-parallel actuation

The highest accuracy is achieved if the sensor is directly actuated by the target. Both side and front actuation is possible. In order to utilise the full measuring range, it is important to work with an appropriately sized target. This may also be a moving part of the machine.
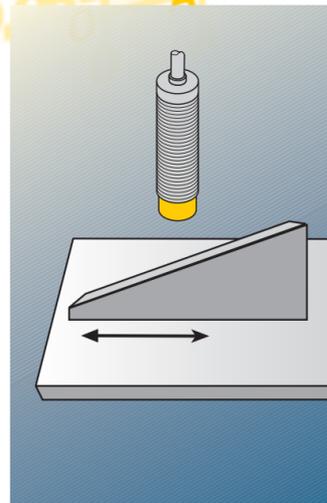
Actuation by a worm drive

A rotary movement can be performed by a worm drive. Every angular position of the axis can thus be assigned to a measuring value of the sensor. This is also an ideal sensing solution for incomplete rotary motion (e.g. positioning plates or swivel arms) where merely small angles have to be detected.
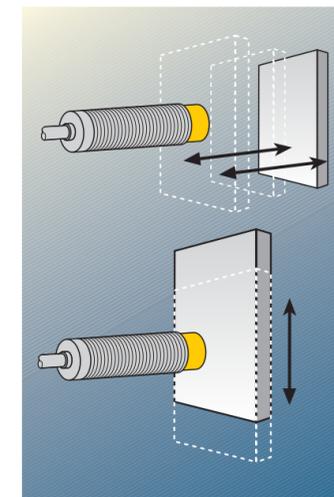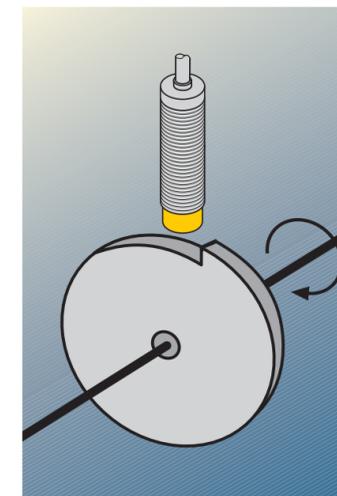
Actuation over an oblique plane

When detecting extensive linear motion and converting it into analog signals, the large distance across an oblique plane has to be reproducible by the measuring range of the sensor. Consequently, the sensor's resolution is spread over the long distance, but generally this method does not create any problems.

Ring sensors with analogue output – distinction between small parts and position detection

The analogue ring sensor is a new development in the range of ring sensing devices. The combination of high precision analogue sensing technology with the symmetric coil arrangement of a ring sensor yields distinct advantages for many applications. Due to the concentrated magnetic field inside the ring sensor, the attenuation variable is hardly affected by exact positioning of the target in the ring. Consequently, a stable and constant output signal is generated, even if the target position in the ring fluctuates. This technology makes it possible to profile small parts (screws, rivets or the like), to distinguish between different tools and to implement an affordable means of position control.

## Application possibilities of analogue ring sensors

Thickness measurement, parts detection

Analogue ring sensors are capable of distinguishing and identifying parts of different shape and size. A tooling change monitoring function can be easily realized with this sensing method.
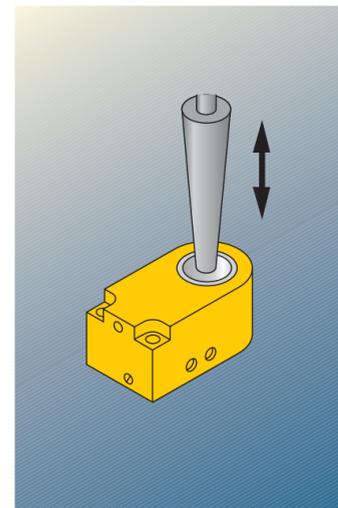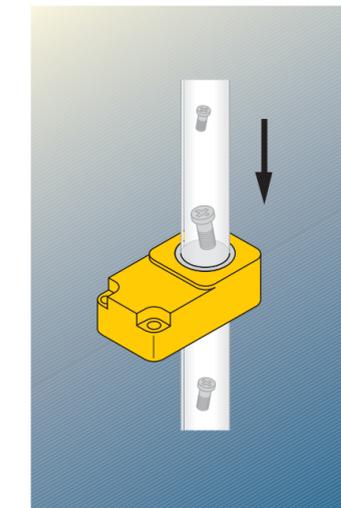
Identification of small parts

When falling through the ring, screws, rivets or other small parts, e.g. screws of different size, generate a characteristic output signal, so that the target can be easily identified. Due to the concentrated magnetic field, also flexibly guided parts can be detected reliably.
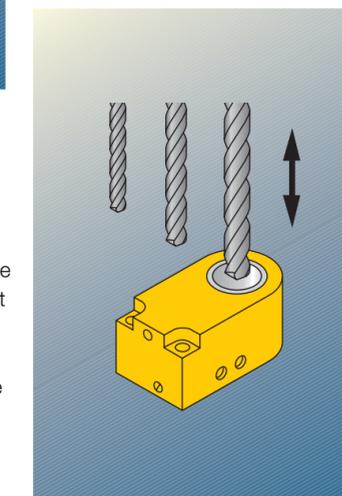
Position control

Position control can be easily accomplished by means of a cone-shaped target. Measuring ranges can be adapted to specific sensing needs by using targets with an appropriate cone length. These sensors enable precise and simple position detection, even if the targets feature a slight offset.