lilltec Messtechnik

Measure

Willtec Messtechnik

We are a family company from the heart of the Black Forest, where we maintain decades-long traditions of precision and innovative products. Our core competencies are:

- close customer relations and on-time delivery
- practice-oriented solutions via sophisticated technologies
- full packages of selected components
- favourable price-performance ratios due to effective administrative procedures.

We provide you with metrology solutions all around mechanical engineering
The longtime experience of metrology in mechanical engineering is successfully carried forward and further extended by us. Our focus lies not only on mechanical but also on electronic systems. Through in-house production supported by leading industry representations, Willtec Messtechnik offers multi-variant solutions for custom or standard metrology purposes.

Find Willtec Messtechnik on the internet at **www.willtec.de** or pay us a visit at our facility, centrally located near the A5 highway (exit Freiburg Mitte), where you can experience metrology first hand.

Let us demonstrate our products and our know-how in our 220 m² showroom.

distribution

construction and development

quality control – metrology and inspection

production

extensive component and prefab parts storehouse

220 m² showroom

table of contents

overview

Willtec range measurements and positioning
... precise measurements for your success!

Our broad product portfolio allows us to always provide you with a suitable and efficient solution for your measurement or positioning tasks. Next to various different operating principles, Willtec Messtechnik offers you solutions with accuracies up to 0.5 µm and maximum ranges up to 500 m.

Benefit from our flexibility and obtain the ideal individually tailored measuring system made by Willtec Messtechnik. In order to provide you with a large product variety, we supply you not only with our own in-house products but also with measuring systems manufactured by Willtec Messtechnik's renowned partners. Profit from our longstanding experience in the field of measurement and positioning and find your proper measuring system together with us!

Your advantages:
- single source solutions
- individual solutions
- more flexibility
- less downtime

Our strengths:
- variety of products
- fast and straightforward communication and processing

Our team is happy to support you
We will find the optimal solution for your measurement task:
telephone: +497665/93465-0
mail: info@willtec.de

quick selection - accuracy / linearity

measure

digital → measure	up to maximum
optical scales	±1µ
magnetic range and angle measurement systems	±5µ
linear potentiometers	±0.05%
incremental draw-wire encoders	±100µ
micropulse transducers	±100µ
inclination sensors	±0.1%

positioning

analog → positioning	up to maximum
potentiometric draw-wire encoders	±0.5%
ultrasonic distance sensors	±0.15%
optical distance sensors/XXL	±0.5mm
optical distance sensors/standard	±0.5%
inductive distance sensors	±1.0%
capacitive distance sensors	±1.0%

quick selection - measurement range

optical distance sensors/XXL • **500 000 mm**

magnetic range and angle measurement systems • **48 000 mm**

draw-wire encoders • **20 000 mm**

micropulse transducers • **7 620 mm**

optical scales • **7 500 mm**

optical distance sensors/standard • **6 000 mm**

ultrasonic distance sensors • **6 000 mm**

linear potentiometers • **1 750 mm**

inductive distance sensors • **20 mm**

capacitive distance sensors • **8 mm**

quick selection – suitable measurement systems

range and angle measurements / measurement systems

On range sensors, it is mostly a system integrated positon encoder which is acting as position sensing element.

	rotary encoders		magnetic range and angle measurement systems		optical scales	
						
measuring principle	optical / magnetic		magnetic		optical	
measuring method	incremental	absolute	incremental	absolute	incremental	absolute
interface	TTL; HTL; 1 Vpp	SSI; Fieldbus	TTL; HTL; 1 Vpp	SSI; BiSS-C; CANopen	TTL; HTL; 1 Vpp	SSI
resolution	up to ± 12 500 pulses	up to ± 16 bit	up to ± 0.5 µ	up to ± 1 µ	up to ± 0.1 µ	up to ± 0.1 µ
accuracy	-	-	up to ± 5 µ	up to ± 10 µ	up to ± 1 µ	up to ± 1 µ
measurement range	-	14 bit/16 384 rev.	up to 100 000 mm	up to 48 000 mm	3 240 mm	
typical applications	• mechanical engineering • drive technology • wind power		• wood working machines • drive technology • solar / wind power		• machine tools • distance measurements • test benches	

positioning - distance sensors

On distance sensors any object can act as position indicating element. Material and surface composition of the position indicating element influence the quality of the measurement.

	optical distance sensors / XXL	optical distance sensors / standard	ultrasonic distance sensors
			
measuring principle	optical / laser	optical	ultrasound
measuring method	absolute	absolute	absolute
interface	analog	analog	analog
resolution	-	up to ± 30 µ	up to ± 0.025 mm
accuracy	up to ± 0.5 mm	up to ± 0.5 %	up to ± 0.15 %
measurement range	up to 500 000 mm	up to 500 000 mm	up to 500 000 mm
typical applications	• logistics • mechanical engineering • transport and conveyor technology	• logistics • mechanical engineering • conveyor technology	• automotive industry • handling / automation • packaging and filling industry

for your requirements

draw-wire encoders			linear potentiometers		micropulse transducers		inclination sensors
							
potentiometric/digital			potentiometric/digital		magnetostrictive		magnetic
analog	incremental	absolute	analog/absolute	incremental	absolute		analog/absolute
R; I; V	TTL; HTL; 1 Vpp	SSI; Fieldbus	R; I; V	TTL; HTL	R; I; V; SSI; Fieldbus		R; I; V
	up to ±0.01 mm	up to ±0.01 mm	-	-	up to ±1 µ		up to ±0.01°
	-	-	up to ±0.05 %	up to ±0.05 %	linearity up to ±100 µ	repeatability up to ±2 µ	up to ±0.1°
	up to 20 000 mm	up to 20 000 mm	1 750 mm		7 620 mm		up to 360°
• crane technology • assembly technology • lift technology			• plastics injection molding machines • sheet metal processing machines • assembly technology		• machine tools • injection molding machines • presses		• solar / wind power • medicine technology • oil and gas extraction

inductive distance sensors	capacitive distance sensors
	
inductive	capacitive
absolute	absolute
analog	analog
-	-
up to ±1.0 %	up to ±1.0 %
up to 20 mm	up to 8 mm
• injection molding machines • handling/automation • packaging industry	• packaging and filling industry • handling/automation • plastics injection molding machines

rotary encoders

rotary encoders - incremental and absolute

The company Willtec Messtechnik distributes rotary encoders manufactured by the company Scancon from Denmark and the company Fiama from Northern Italy. These rotary encoders are based both on the optical as well as the magnetic measurement principle.

Rotary encoders made by Scancon maintain the global top postion of number of pulses at the smallest spatial requirements. Incremental encoders can be issued with an outside diameter between 9 mm and 50 mm with 1 000 to 12 500 true pulses per revolution and in quill or solid shaft design, combined with various different mechanical or electronic interfaces.

your advantages at a glance

- simple measuring system
- compact design
- diverse interfaces
- high resolution on small design

optical rotary encoder / interior view

sectors

- general mechanical engineering
- propulsion technology
- wind power
- solar industry

incremental rotary encoders

product type	pulses	Ø without spring	max. frequency or rev/min	shaft load	supply voltage	IP-rating	shaft size	options
 **SC09** • nano quill shaft rotary encoder	500	Ø9 mm	200 kHz or max. 12 000 rev/min	radial: 1 N axial: 1 N	5.0 V	IP54	Ø2	• flat cable
 **SCA16** • micro solid shaft rotary encoder	100 to 5 000	Ø16 mm	200 kHz or max. 12 000 rev/min	radial: 5 N axial: 5 N	5.0 V	IP54	Ø2 Ø3 Ø4	• flat cable • 10 conductors with IDC connectors
 **SCH16F** • micro quill shaft rotary encoder	100 to 5 000	Ø16 mm	200 kHz or max. 12 000 rev/min	radial: 5 N axial: 5 N	5.0 V	IP54	Ø1.5 Ø2 Ø3 Ø⅛"	• flat cable • 10 conductors with IDC connectors
 **SCA24** • mini solid shaft rotary encoder	4 to 7 500	Ø24 mm	200 kHz or max. 12 000 rev/min	radial: 20 N axial: 20 N	4.5 V to 30.0 V	IP64 or IP65	Ø4 Ø6	• solid shaft lengths: 5, 9, 15, 20 mm • silicon cable • flat cable • Teflon cable
 **2RMHF** • mini quill shaft rotary encoder	4 to 7 500	Ø24 mm	200 kHz or max. 12 000 rev/min	radial: 20 N axial: 20 N	4.5 V to 30.0 V	IP64	Ø3 Ø4 Ø5 Ø6 Ø¼"	• silicon cable • flat cable • Teflon cable
 **SCA30** • solid shaft rotary encoder	4 to 7 500	Ø30 mm	200 kHz or max. 9 000 rev/min	radial: 15 N axial: 10 N	4.5 V to 30.0 V	IP50 or IP64	Ø4 Ø6	• silicon cable
 **SCA38** • solid shaft rotary encoder	4 to 7 500	Ø38 mm	200 kHz or max. 9 000 rev/min	radial: 20 N axial: 10 N	4.5 V to 30.0 V	IP50 or IP64	Ø4 Ø6	• silicon cable
 **SCA50** • solid shaft rotary encoder	1 to 12 500	Ø50 mm	300 kHz or max. 12 000 rev/min	radial: 20 N axial: 20 N	4.5 V to 30.0 V	IP65 or IP67	Ø6 Ø8 Ø10 Ø¼" Ø⅜"	• silicon cable
 **SCA58** • solid shaft rotary encoder	1 to 12 500	Ø58 mm	300 kHz or max. 12 000 rev/min	radial: 20 N axial: 20 N	4.5 V to 30.0 V	IP65 or IP67	Ø6 Ø8 Ø10 Ø¼"	• silicon cable
 **SCH50i** • quill shaft, continuous mounting front side	1 to 9 000	Ø55 mm	300 kHz or max. 3 000 rev/min	radial: 50 N axial: 50 N	4.5 V to 30.0 V	IP65	Ø10 Ø12 Ø14	• silicon cable
 **SCH50iB** • quill shaft, mounting front / back	1 to 9 000	Ø50 mm	300 kHz or max. 6 000 rev/min	radial: 50 N axial: 50 N	4.5 V to 30.0 V	IP65	Ø10 Ø12 Ø14 Ø15 Ø16	• silicon cable
 **SCH50B** • quill shaft, continuous mounting front side	1 to 12 500	Ø50 mm	300 kHz or max. 12 000 rev/min	radial: 20 N axial: 20 N	4.5 V to 30.0 V	IP65	Ø6 Ø8	• silicon cable
 **SCH50F** • quill shaft mounting front side	1 to 12 500	Ø50 mm	300 kHz or max. 12 000 rev/min	radial: 20 N axial: 20 N	4.5 V to 30.0 V	IP65	Ø6 Ø8	• silicon cable

rotary encoders

incremental rotary encoders

product type	pulses	Ø without spring	max. frequency or rev / min	shaft load	supply voltage	IP-rating	shaft size	options
 **2RSR** • solid shaft rotary encoder	1 to 12 500	Ø50 mm	300 kHz or max. 6 000 rev / min	radial: 20 N axial: 20 N	4.5 V to 30.0 V	IP67	Ø6 Ø8 Ø10	• silicon cable
 **SCA50IF-SR** • quill shaft rotary encoder	1 to 9 000	Ø50 mm	300 kHz or max. 3 000 rev / min	radial: 50 N axial: 50 N	4.5 V to 30.0 V	IP67	Ø10 Ø12 Ø14 Ø15	• silicon cable
 **2RK** • solid shaft rotary encoder	1 to 12 500	Ø58 mm	300 kHz or max. 6 000 rev / min	radial: 100 N axial: 50 N	4.5 V to 30.0 V	IP65 or IP67	Ø10 Ø⅜"	• silicon cable
 **2R58** • solid shaft rotary encoder	1 to 12 500	Ø58 mm	300 kHz or max. 6 000 rev / min	radial: 50 N axial: 50 N	4.5 V to 30.0 V	IP66	Ø6 Ø8 Ø10	• silicon cable
 **2RCI** • solid shaft rotary encoder	1 to 12 500	Ø115 mm	300 kHz or max. 5 000 rev / min	radial: 100 N axial: 50 N	4.5 V to 30.0 V	IP66	Ø11	• silicon cable • lateral cable outlet
 **2RP** • solid shaft rotary encoder	1 to 12 500	Ø80 mm	300 kHz or max. 6 000 rev / min	radial: 100 N axial: 50 N	4.5 V to 30.0 V	IP65	Ø10	• silicon cable
 **2RMHD** • solid shaft rotary encoder	4 to 7 500	60 x 60 x 71 mm	200 kHz or max. 3 000 rev / min	radial: 250 N axial: 250 N	4.5 V to 30.0 V	IP65	Ø15	• silicon cable • backside cable outlet
 **2RHDS** • solid shaft rotary encoder	1 to 12 500	70 x 70 x 94 mm	300 kHz or max. 3 000 rev / min	radial: 500 N axial: 500 N	4.5 V to 30.0 V	IP65 or IP67	Ø12 Ø15	• silicon cable
 **2REX-H** • quill shaft rotary encoder	1 to 9 000	Ø68 mm	300 kHz - IP66 = max. 3 000 rev / min - IP67 = max. 1 500 rev / min	radial: 50 N axial: 50 N	4.5 V to 30.0 V	IP66 or IP67	Ø10 Ø12 Ø14 Ø15	• non-halogen cable • cable connector for hydraulic hose • stainless steel = IP67
 **2REX-A** • solid shaft rotary encoder	1 to 9 000	Ø68 mm	300 kHz - IP66 = max. 3 000 rev / min - IP67 = max. 1 500 rev / min	radial: 50 N axial: 50 N	4.5 V to 30.0 V	IP66 or IP67	Ø10	• non-halogen cable • cable connector for hydraulic hose • stainless steel = IP67
 **2REXI** • solid shaft rotary encoder	1 to 9 000	Ø68 mm	300 kHz or max. 3 000 rev / min	radial: 50 N axial: 50 N	4.5 V to 30.0 V	IP65	Ø8 with quill shaft Ø8 and Ø16 with solid shaft	• non-halogen cable • Magnetischer Umdrehungsdet. • lateral cable outlet
 **TYP D** • solid shaft and clutch	50 or 100	83 x 30 x 30 mm	1 kHz or max. 5 000 rev / min	radial: 5 N axial: 5 N	5 V to 24 V	IP54	Ø4 or clutch	• gear • recoil break • lateral cable outlet
 **SCA24EX** • solid shafts	25 to 3 600	Ø24 mm	200 kHz or max. 3 000 rev / min	radial: 10 N axial: 10 N	5 V to 24 V	IP67	Ø4 Ø6	• non-halogen cable

incremental rotary encoders

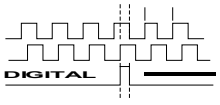
product type	pulses	Ø without spring	max. frequency or rev / min	shaft load	supply voltage	IP-rating	shaft size	options
 **IH20 •** solid shaft rotary encoder	1 to 1 024	58 x 90 mm	100 kHz	radial: 60 N axial: 40 N	5 V or 11 - 27 V	IP54	Ø10 Ø12 Ø16	• different flange variants
 **IH20 •** quill shaft rotary encoder	1 to 1 024	58 x 90 mm	100 kHz	radial: 60 N axial: 40 N	5 V or 11 - 27 V	IP54	up to Ø20 mm	• different flange variants, IP54
 **ENP6 •** solid shaft rotary encoder	1 to 500	48 x 66 mm	25 kHz	radial: 30 N axial: 20 N	10 - 25 V or 5 V	IP54	up to Ø20 mm	• combinable with digital pos. OP6, OP7 and EP7
 **EN14 •** solid shaft rotary encoder	1 to 1 024	48 x 66 mm	25 kHz	radial: 30 N axial: 20 N	10 - 25 V or 5 V	IP54	up to Ø14 mm	• mechanical replacment compatible to dig. pos. OP6, OP7 and EP7
 **EN20 •** solid shaft rotary encoder	1 to 1 024	48 x 66 mm	25 kHz	radial: 30 N axial: 20 N	10 - 25 V or 5 V	IP54	up to Ø20 mm	• mechanical replacment compatible to dig. pos. OP6, OP7 and EP7
 **EN25 •** solid shaft rotary encoder	1 to 1 024	48 x 66 mm	25 kHz	radial: 30 N axial: 20 N	10 - 25 V or 5 V	IP54	up to Ø25 mm	• mechanical replacment compatible to dig. pos. OP6, OP7 and EP7

analog rotary encoders / potentiometric

product type	output	shaft diameter	number of revolutions	shaft load	supply voltage	IP-rating	shaft size	options
 **PR10 •** solid shaft rotary encoder	10 kΩ	40 x 82 mm	0.5 - 26	radial: 20 N axial: 10 N	5 V to 24 V	IP54	Ø6	
 **PR20 •** solid shaft and clutch	10 kΩ, 4-20 mA, 0-10 V	52 x 92 mm	0.33 - 900	radial: 10 N axial: 10 N	5 V to 24 V	IP54	Ø20	• CANopen, DS301
 **PR20-HALL •** solid shaft	0-10 V, 1-20 mA	52 x 92 mm	0.33 - 2 000	radial: 10 N axial: 10 N	5 V to 24 V	IP67	Ø20	

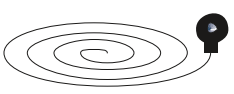
further options

digital output:
standard, inverted or discriminated. Including index pulse (Z).



cable outlet:
backside (axial), lateral (radial)

cable length:
on request



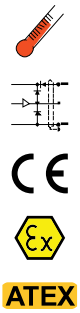
absolut rotary encoders

product type	diameter	shaft	interface	version	resolution	IP-rating	flange	housing
 **SCA24AN •** mini solid shaft rotary encoder	24	solid shaft Ø3-6 mm	SSI, analog	singleturn	10 bit	IP64	servo	steel
 **SCH24AB •** mini quill shaft rotary encoder	24	quill shaft Ø3-6 mm	SSI, analog	singleturn	10 bit	IP64	3 point spring	steel
 **2RMHF-SSI •** mini solid shaft rotary encoder	24	solid shaft Ø3-6 mm	SSI	singleturn, multiturn	13 bit	IP64, IP67	servo	steel
 **2RMHF-SSI •** mini quill shaft rotary encoder	24	quill shaft Ø3-6 mm	SSI	singleturn, multiturn	13 bit, 13/14 bit	IP64, IP67	3 point spring	steel
 **SCM •** micro solid shaft rotary encoder	36	solid shaft Ø6 mm	SSI, CANopen	singleturn, multiturn	12 bit, 12/13 bit	IP54, IP64	servo	AL
 **SCM •** mini solid shaft rotary encoder	36 - 58	solid shaft Ø10 mm	SSI, CANopen	singleturn, multiturn	12 bit, 12/13 bit	IP54, IP64	clamp	AL
 **SCM •** mini quill shaft rotary encoder	36	quill shaft Ø6 mm	SSI, CANopen	singleturn, multiturn	12 bit, 12/13 bit	IP54, IP64	spring	AL
 **SAG •** solid shaft rotary encoder	58	solid shaft Ø6-10 mm	SSI, CANopen, Profibus, DeviceNet, Ethernet, Profinet IO	singleturn, multiturn	12/14 bit, 12/13/16 bit	IP64	synchro, clamp	steel
 **SAG •** quill shaft rotary encoder	58	quill shaft Ø6-15mm	SSI, CANopen, Profibus, DeviceNet, Ethernet, Profinet IO	singleturn, multiturn	12/14 bit, 12/13/16 bit	IP64	spring	steel
 ATEX **EXAG ATEX •** solid shaft rotary encoder	78	solid shaft Ø10, 12 mm	SSI, CANopen, Profibus, DeviceNet, Ethernet, Profibus Dual/incr.	singleturn, multiturn	12/14 bit 12/16 bit	IP64 - IP68	servo, clamp, square	AL, AISI303, AISI316
 ATEX **EXAG ATEX •** quill shaft rotary encoder	78	quill shaft Ø12, 14, 16 mm	SSI, CANopen, Profibus, DeviceNet, Ethernet	singleturn, multiturn	12/14 bit 12/16 bit	IP64 - IP68	servo, clamp, square	AL, AISI303, AISI317
 ATEX **EXAG ATEX mining •** solid shaft, continuous mounting front side	78	solid shaft Ø10, 12 mm	SSI, CANopen, Profibus, DeviceNet	singleturn, multiturn	12/14 bit 12/16 bit	IP64 - IP68	servo, clamp, square	AL, AISI303, AISI318
 ATEX **EXAG ATEX mining •** quill shaft, mounting front/ back side	78	quill shaft Ø12, 14, 16 mm	SSI, CANopen, Profibus, DeviceNet	singleturn, multiturn	12/14 bit 12/16 bit	IP64 - IP68	servo, clamp, square	AL, AISI303, AISI319

by the way ...

standard for all rotary encoders

- operating temperature: -40°C to +85°C
- operating temperature for rotary encoders type SC09, 2MCA and 2MCH: 0°C to +70°C
- thermal fuse up to 155°C
- reverse polarity and short circuit protection
- strong, compact electronics, SMD technology
- can be directly connected to a SPS or to a counter
- CE certificated according to EN50081-1 and EN50082-2
- explosion protected pulse generator with EEx certificate according to EXX-d IIC T6 and EXX-d IIB T6 for rotary encoders type 2REX-A, 2REX-H, 2REXI and type D

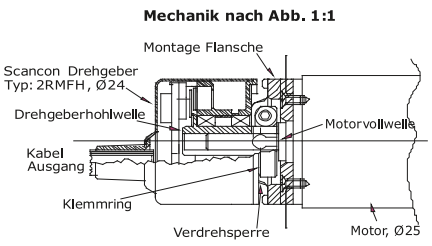


attachment kits

- **Maxon engine**
  mounting flange and spring coupling kits available for engines with Ø9, Ø16 to Ø45 and Ø75
- **Faulhaber and mini engine**
  mounting flange and spring coupling kits available for engines with Ø9, Ø16 to Ø38
- **Wittenstein**
  mounting flange and spring coupling kits available for engines with Ø22 to Ø32
- **Mavilor**
  mounting flange and spring coupling kits available for engines with Ø24 to Ø34 and Ø58
- **Dunker engines**
  for Ø60
- **Transcoil**
  for Ø16 and Ø19
- **Portescap**
  for 28DT12
- **Danfoss**
  for OMS

more than 150 attachment kits for small DC/EC engines

mounting example for engine and rotary encoder



- **scale 1:1**
  Scancon rotary encoder,
  type SC09 Ø9 with Ø8 engine

- **scale 1:1**
  Scancon rotary encoder,
  type 2MCH Ø16 with Ø16 engine

accessory

- metal bellows couplings
- polyamide couplings
- spring couplings
- claw couplings
- reverse couplings

- measuring wheels

- Mil connector, axial mounted
- IDC connector for flat cables
- Conin amplifier

- torsional stiff spring couplings
- mounting flanges
- pressure chambers
- mounting plates

- angle flanges

- customized rotary encoder solutions
- very large ball bearing blocks
- more than 150 special attachment kits for small DC / EC engines

rotary encoders

applications

SCH94

This rotary encoder with a diameter of 94 mm was designed according to the specific standards and requirements of wind turbines.

A special feature of this rotary encoder is the integrated surge protection.

application: generators

SCH94FO

This rotary encoder with 94 mm diameter is the first robust glass fiber rotary encoder for industrial applications. Output signals are sent via glass fiber or digitally (dual output). The rotary encoder has an inbuilt surge protection.

application: generators

SCA115

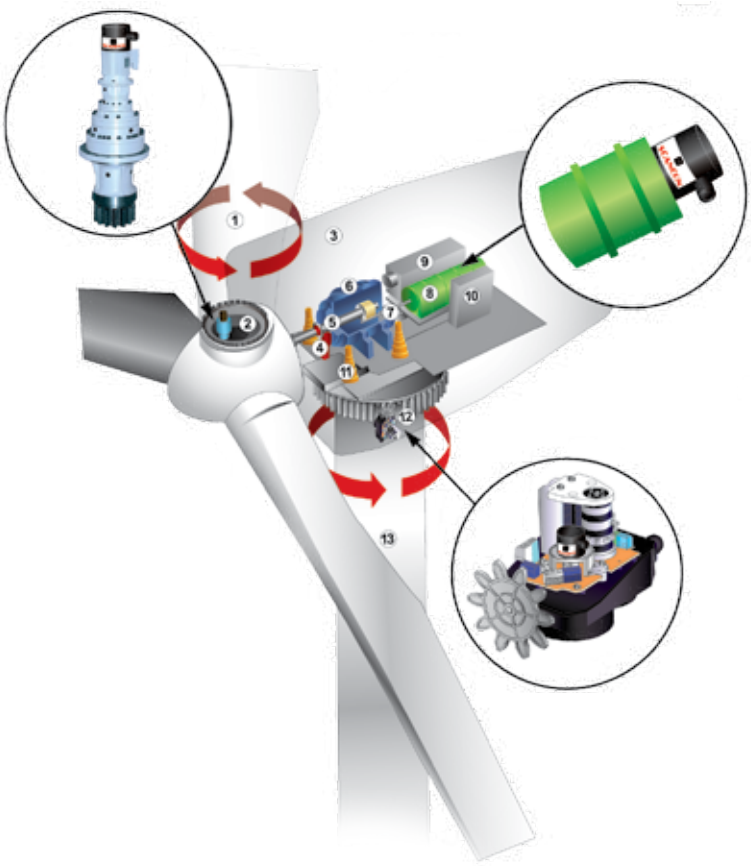
robust rotary encoder with a flange diameter of 115 mm, special design for heavy mechanical strains.

application: generators

SCA24

Miniature rotary encoders with a diameter of 24 mm, specifically designed for applications with little room. Inbuilt surge protection EMV Tests according to EEC standard for versions with TSM module (see Scancon EEC-declaration).

application: yaw control



legend

① rotor blades
② pitch-drive
③ nacelle
④ brake
⑤ low speed shaft
⑥ gearbox
⑦ high speed shaft
⑧ generator
⑨ recuperator
⑩ control
⑪ yaw drive
⑫ yaw control
⑬ tower

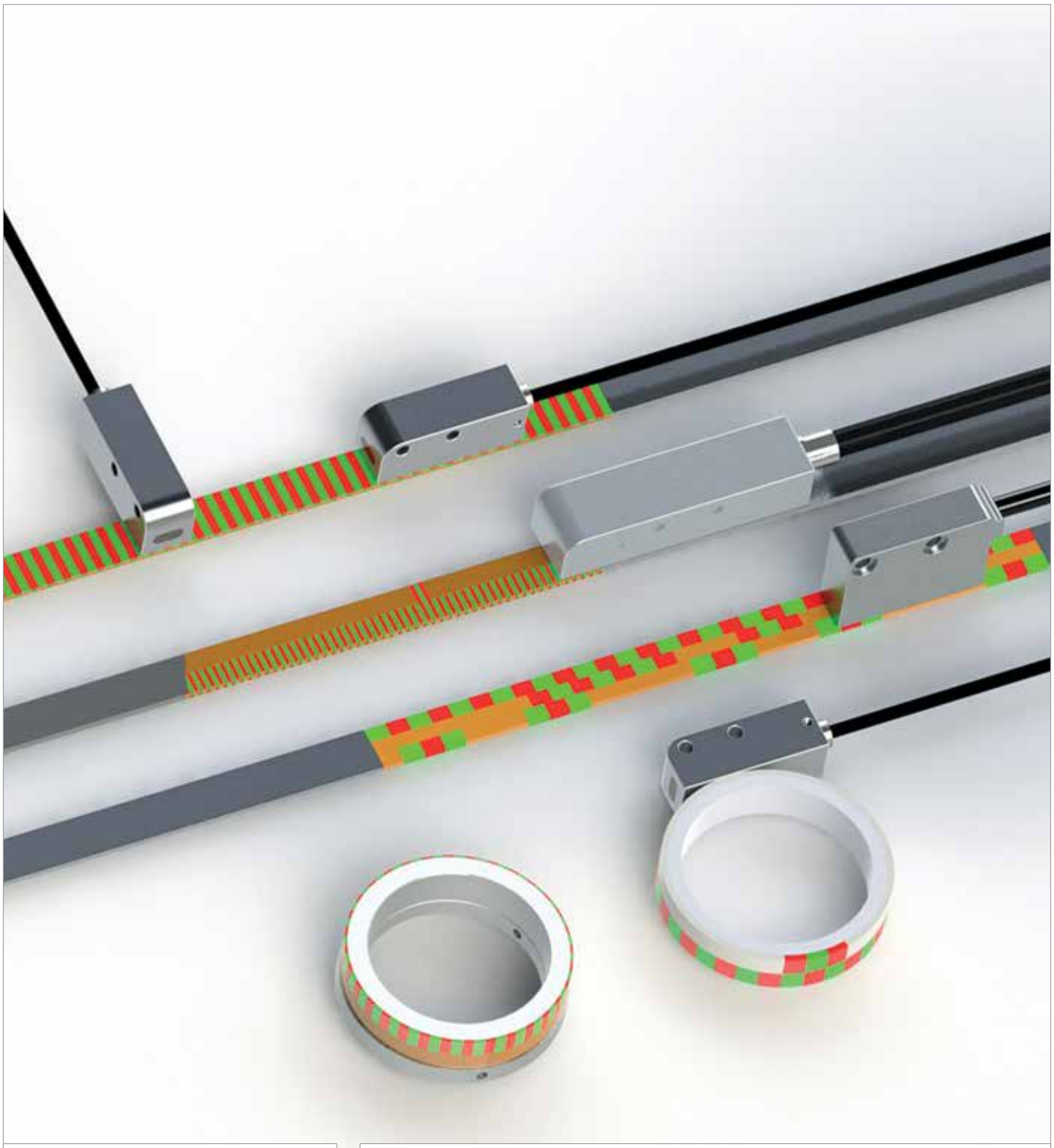
rotary encoders on engines

optical rotary encoders / interior view

heavy industry / petrol chemistry

automation technology

magnetic range and angle measurement systems



sectors	your advantages at a glance
• wood processing machines • machine tools • packaging industry • drive technology • wind / solar power	• flexible applications and easy assembly • low spatial requirements • high accuracy measurements • wear-free measurements • real-time capable system • robust and resistant against dirt and moisture

functionality of magnetic measurement technology

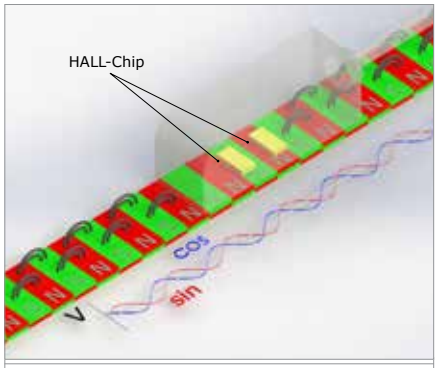
Magnetic distance and angle measuring systems are a cheap and flexible solution for the implementation of you measurement task.

Operating principle:
The alternating polarization of a coded magnetic strip is scanned by a magnetic sensor without physical contact. One sine/cosine wave is generated per pole. The shape of the sine/cosine wave is electronically interpolated and defines the measurement resolution depending on the interpolation procedure and pole spacing of the magnetic strip.

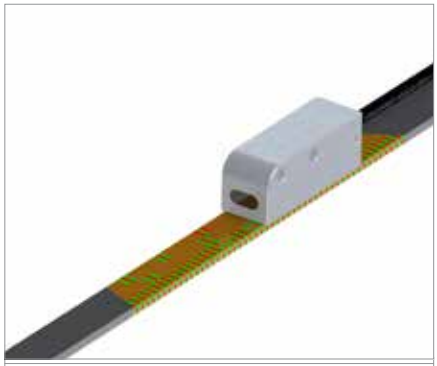
Special analysis electronics (interpolation) are used to evaluate the sine signal. These generate square-wave output signals from the signal information of the magnetic strip, which are compatible with conventional rotary encoders or optical linear encoders. Magnetic strips for absolute distance measurements are magnetized on 3 tracks: one digital track and two tracks with absolute coding.

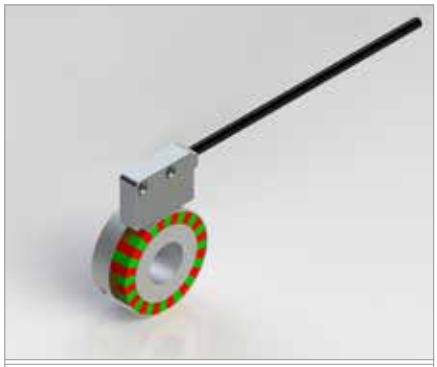
Our magnetic distance and angle measurement system consists out of a sensor head and a magnetic strip or ring. Magnetic sensors for incremental, absolute or quasi-absolute distance measurements are available in diverse designs. There are different accuracy classes between 5 µm and 1 mm, suitable for any purpose. The magnetic strips can be issued up to a length of 100 m. They are magnetized with pole pitches of 1, 2 or 5 mm. The magnetic strips can be permanently attached to a carrier strip made out of stainless steel.

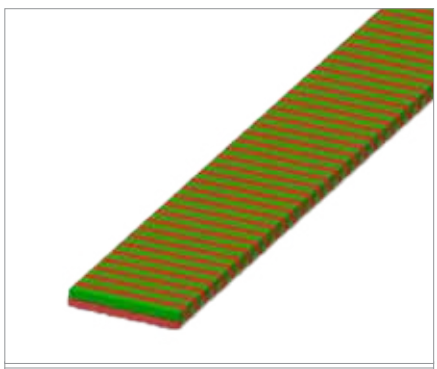
Magnetic rings, for example in combination with a magnetic sensor, constitute a precise solution with special advantages when it comes to rotatory distance, angle or rotational speed detection. Our magnetic rings stand out through their particularly flat design, resistance against dust, humidity and chips as well as wear-free scanning and high resolution.

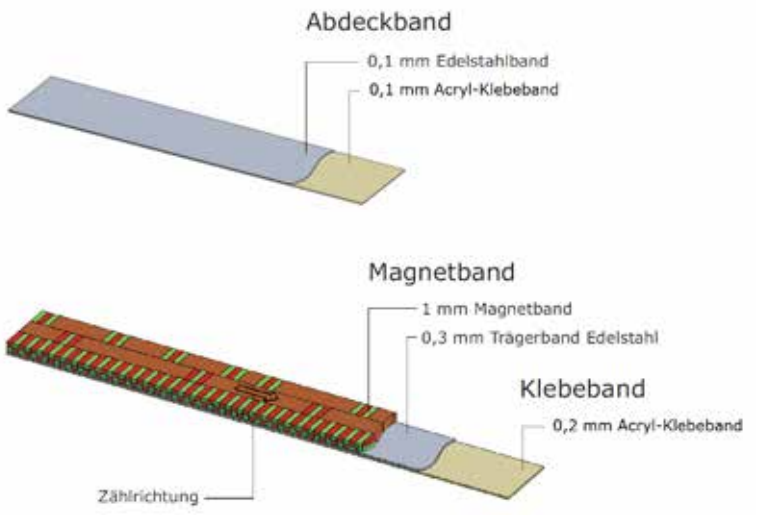


functionality


sensor head and magnetic strip

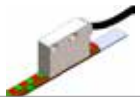
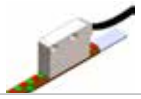
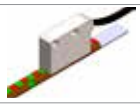
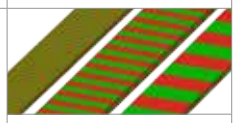
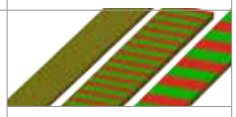
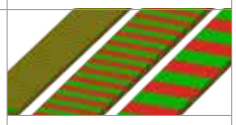
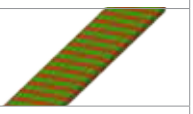

magnetic ring


magnetic strip



magnetic range and angle measurement systems

magnetic sensors – incremental

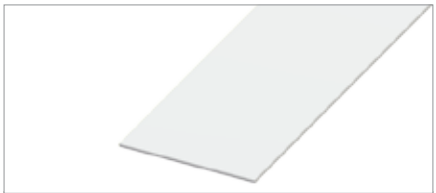
product type	measuring method pole width resolution	accuracy measuring length	interface	special features	matching magnetic strip
 magnetic sensor EHP1	incremental 1 mm 10 µm, 5 µm, 1 µm, 0.5 µm	up to ± 5 µm depending on magnetic strip	digital A/B-Z signals, RS422, analog sine/ cos, 1Vpp	metal housing, mounting orientation 90° or lengthwise	 magnetic strip PM1
 magnetic sensor LHR5	incremental 5 mm 5 µm	± 100 µm up to 48 m	TTL, PushPull	high robustness, extremely low-noise sensors, IP-rating IP67	 magnetic strip PM5
 magnetic sensor S2B / S2E	incremental 5 mm up to 5 µm / 50 µm	up to ± 50 µm /± 100 µm up to 48 m	square signal PushPull	2 freely positionable limit switches, LED display for reference signal	 magnetic strip PM5
 magnetic sensor S1C	incremental 5 mm up to 100 µm	up to ± 100 µm up to 48 m	digital A/B-signals, PushPull		 magnetic strip PM5
 magnetic sensor IMS1 / IMS2 / IMS5	incremental 1 mm: 10, 5, 1, 0.5 µm 2 mm: 1000, 500, 100, 50, 25, 10, 5, 1 µm 5 mm: 250, 100, 50, 25, 10, 5 µm	±10 µm / ± 15 µm / ± 40 µm up to 48 m	Line Driver / PushPull		 magnetic strip MP100 / MP200 / MP500
 magnetic sensor IMS10 / IMS20	incremental 10 mm: 100, 500 µm 20 mm: 100, 500, 1 000, 5 000 µm	10 mm: 200 µm 20 mm: 500 µm	Line Driver / PushPull	long measuring distance between sensor and strip	 magnetic strip MP1000 / MP2000
 magnetic sensor IMV1 / IMV2 / IMV5	incremental 1 mm / 2 mm / 5 mm 0.1 µm	± 10 µm / ± 15 µm / ± 40 µm up to 48 m	sine 1 Vss		 magnetic strip MP100 / MP200 / MP500
 magnetic sensor IME1 / IME2 / IME5	incremental 1 mm: 10, 5, 1, 0.5 µm 2 mm: 1 000, 500, 100, 50, 25, 10, 5, 1 µm 5 mm: 250, 100, 50, 25, 10, 5 µm	± 10 µm / ± 15 µm / ± 40 µm up to 48 m	Line Driver / PushPull	very small sensor, external processing electronics	 magnetic strip MP100 / MP200 / MP500
 magnetic sensor GVS 215	incremental 2 + 2 mm 15 µm	up to ± 1 µm up to 48 m	Line Driver / PushPull	guided system	 integrated
 magnetic sensor MSR128	incremental 2; 2.5; 5 mm 10 µm	± 100 µm up to 48 m	digital 5 V 24 VDC on request	round design, inexpensive, no reference point	 magnetic disc
 magnetic sensor 12M	incremental 5 mm 1 switching operation / pole	0.1 mm up to 48 m	PNP or NPN	round design M12	 magnetic strip PM5

magnetic sensors – absolute

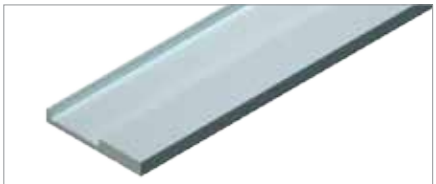
product type	measuring method pole width resolution	accuracy measuring length	interface	special features	matching magnetic strip
 magnetic sensor AHP2L	absolute 2 mm 1 µm	± 10 µm up to 48 m	BiSS-C, SSI, analog or digital	high accuracy, easy installation, long measuring distances	 magnetic strip M02-A
 magnetic sensor AHP2-IOL	absolute 2 mm 1 µm	± 10 µm up to 48 m	IO-Link, analog 1 Vss	IO-linkable	 magnetic strip M02-A
 magnetic sensor AHP1 and AHP1/90	absolute 1 mm up to 0.5 µm	up to ± 5 µm up to 512 mm	BiSS-C, SSI, analog	small design, mounting orientation 90° or lengthwise	 magnetic strip PMA1
 magnetic sensor AMS2 and AMS2-CAN	absolute 2 mm up to 1 µm	up to ± 15 µm up to 30 m	BiSS-C, SSI, analog CANopen	• very good price / performance ratio • available in 2 different housing (aluminum and die-cast zinc)	 magnetic strip MBA2
 magnetic sensor GVS 219	absolute 2 + 2 mm up to 1 µm	± 15 µm up to 3 240 mm	BiSS-C, SSI, analog	guided system	 integrated

optional accessory

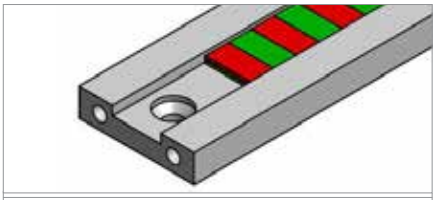
cover tape DB01



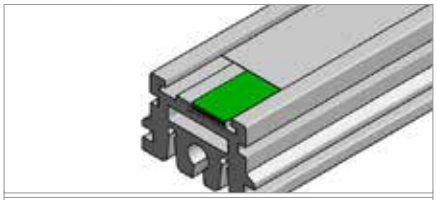
cover tape DB50



profile rail PS1



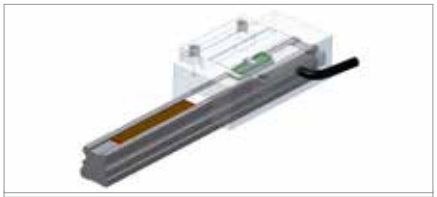
profile rail SB



profile rail PS6

displays

slide guide with slider



ball caster guide with slider

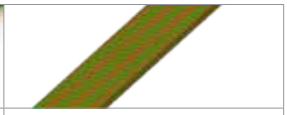
power supply units

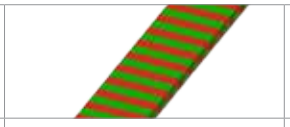
magnetic range and angle measurement systems

magnetic sensoren – quasi-absolut

product type	measuring method pole width resolution	accuracy measuring length	interface	special features	matching magnetic strip
 magnetic sensor C10 Kit-I	quasi-absolute 5 mm up to 10 µm	up to ± 50 µm depending on magnetic strip		battery lifetime 6 months, 6 digits	 magnetic strip PM5
 magnetic sensor C10 Kit-III	quasi-absolute 5 mm up to 10 µm	up to ± 50 µm depending on magnetic strip		battery lifetime 6 months, 6 digits	 magnetic strip PM5
 magnetic sensor F7-P	quasi-absolute 5 mm up to 10 µm	up to ± 100 µm up to 48 m		very small and flat, battery lifetime 4 years, 5 digits	 magnetic strip PM5
 magnetic sensor F7-E	quasi-absolute 5 mm 10 µm	up to ± 100 µm up to 48 m		very small and flat, battery lifetime 4 years, 5 digits	 magnetic strip PM5
 magnetic sensor F7-I	quasi-absolute 5 mm 10 µm	up to ± 50 µm up to 48 m		very small and flat, battery lifetime 4 years, 5 digits	 magnetic strip PM5
 magnetic sensor F8P	quasi-absolute 5 mm 10 µm	up to ± 100 µm up to 48 m		very small and flat, battery lifetime 4 years, 6 digits	 magnetic strip PM5
 magnetic sensor F8P-TL	quasi-absolute 5 mm 10 µm	up to ± 100 µm up to 48 m		modern design, AL stackable housing, battery lifetime 4 years, 6 digits	 magnetic strip PM5
 magnetic sensor F8P-TL/S	quasi-absolute 5 mm 10 µm	up to ± 100 µm up to 48 m		modern design, shortened version, battery lifetime 4 years	 magnetic strip PM5
 magnetic sensor F8P-IF/IS-TL	quasi-absolute 5 mm 10 µm	up to ± 100 µm up to 48 m		battery lifetime 4 years, integrated magnetic sensor, 6 digits	 magnetic strip PM5
 magnetic sensor Vision MS-S	quasi-absolute MP100: 1 mm MP200: 2 mm 10 µm	± 15 µm up to 48 m		integrated battery, battery liftetime 6 month, 7 digits	 magnetic strip PM100
 magnetic sensor Vision MS-L	quasi-absolute 1 mm 10 µm	± 20 µm up to 48 m		integrated battery, battery liftetime 6 month, 7 digits	 magnetic strip PM200

measuring object / magnetic strip

				
product type	PMA	MBA	M02A	PM1
measuring method	absolute	absolute	absolute	incremental
measuring length	up to 256 mm (512 mm)	up to 30 m	up to 48 m	up to 48 m
pole width	1 mm	2 mm	2 mm	1 mm
tracks				1 oder 2
accuracy	up to ± 3 µm	up to ± 20 µm	up to ± 20 µm	up to ± 3 µm
reference point position	not necessary	not necessary	not necessary	none, periodical, fixed-periodic, one or n reference points

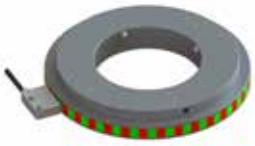
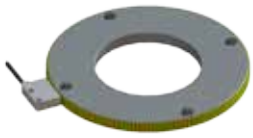
				
product type	PM2	PM5	MT50	MP100/MP200
measuring method	incremental	incremental	incremental	incremental
measuring length	up to 48 m	up to 48 m	up to 100 m	up to 48 m
pole width	2 mm	5 mm	5 mm	1 mm/2 mm
tracks	1 or 2	1 or 2	1 or 2	1 or 2
accuracy	± 15 µm	up to ± 18 µm	± 18 µm, ± 36 µm	± 15 µm
reference point position	none, periodical, fixed-periodic, one or n reference points	none, periodical, fixed-periodic, one or n reference points	none, periodical, fixed-periodic, one or n reference points	none, periodical, fixed-periodic, one or n reference points

				
product type	MP1000	MP2000	MP254	MP625
measuring method	incremental	incremental	incremental	incremental
measuring length	up to 60 m	up to 60 m	up to 60 m	up to 60 m
pole width	10 mm	20 mm	2.54 mm	6.25 mm
tracks	1	1	1	1
accuracy	± 50 µm	up to ± 100 µm	± 15 µm	± 30 µm
reference point position	none, periodical, fixed-periodic, one or n reference points	none, periodical, fixed-periodic, one or n reference points	none, periodical, fixed-periodic, one or n reference points	none, periodical, fixed-periodic, one or n reference points

magnetic range and angle measurement systems

magnet rings – incremental

product type	Ø in mm	magnet width	number of poles	borings (standard)	borings (on request)
 magnet ring MRI	19.7 mm 31 mm 38 mm 50 mm 72 mm 80 mm	4.1 mm 5 mm 5 mm 8 mm 7 mm 10 mm	12, 24, 30 20 24 32 46 50	6 8, 14, 20 8, 14, 20 20, 40 20, 50 20, 50	12 6 - 20 6 - 25 10 - 40 10 - 50 10 - 50
 magnet ring MRI-A	21 mm 32 mm 39 mm 51 mm 73 mm	4.1 mm 5 mm 5 mm 8 mm 7 mm	12, 24, 30 20 24 32 46	6 8, 14, 20 8, 14, 20 20, 40 20, 50	12 6 - 20 6 - 25 10 - 40 10 - 50

 magnet ring 360° radial mount	 magnet ring 360° axial mount	 magnet ring segment, e. g. 300° radial/axial mount – customer-specific assembly	You can obtain various designs of **custom rings** on request. All magnet rings are also available in **dual-track** design.

magnet rings – absolute + incremental track

product type	Ø in mm	magnet width	number of poles	borings (standard)	boring (on request)
 magnet ring WRA25 with sensor WMSA25	24.5 mm	6 mm / 14 mm	25	6, 8, 10, 12, 14, 16	6 - 19.8 mm
 magnet ring WRA50 with sensor WMSA50	50 mm	6 mm / 11 mm	50	16, 20, 25, 30, 40	10 - 44 mm

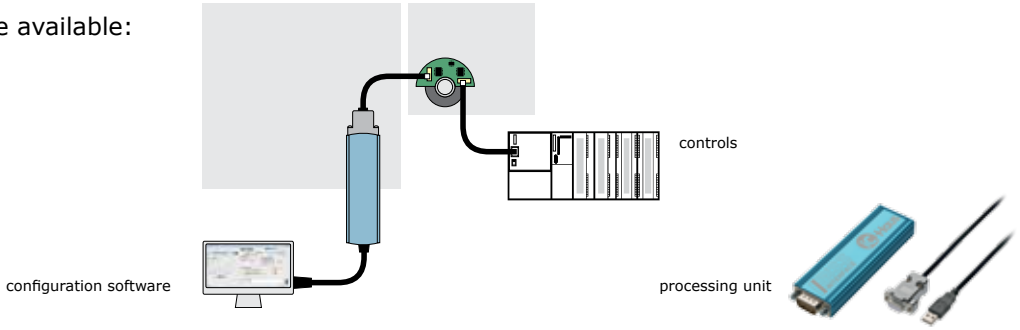
magnetic sensor WMSA25 / WMSA50

- interface: SSI, BiSS, SPI
- measuring method: absolute
- signal resolution
  - incremental: selectable between 1 and 65536 pulses
  - commutated: selectable between 1 and 65536 pole pairs
  - sin/cos: 32 or 64 respectively
  - absolute: 18 bit

disc magnets – absolute – engine feedback system

The engine feedback system is an all-in-one-product and offers many interface options in testing environments. Electronics and geometry of PCBA's can be modified for serial production.

The following interfaces are available:
- BiSS-C
- SSI
- SinCos
- ABZ



Absolute and innovative – the integrable contact-free magnetic feedback system for small engines and actuators:
- high system accuracy
- power saving solution through high signal quality and low engine losses
- absolute positioning for single-turn applications
- useful also for highly dynamic applications (higher resolution and circulation speed)
- perfectly integrable

features:
- magnetic-coded absolute disc (Vernier scale)
- absolute SSI- or BISS-interface
- incremental sin / cos- or ABZ-interface
- resolution up to 17 bit
- circulation speed 12 000 rev / min
- system accuracy < 0.2°

analysis electronics	
• dimensions	24.2×12.1×1.6 mm
• air gap	(sensor/measuring device)
Z	– 0.2... + 0.6 mm
Y	– 0.5... + 0.5 mm
X	– 0.5... + 0.5 mm
• angle deviation	(sensor/measuring device)
yaw	< ± 5°
pitch	< ± 4.5°
roll	< ± 4.5°
• mounting borings	2 × Ø2 mm, 3 × Ø3.4 mm

perpendicularly magnetized absolute disc – 2-track-Vernier scale	
• air gap	0.3 ± 0.2 mm
• system accuracy with iC-MU	< ± 0.2° absolute (error per rev.)
• operating temperature	– 40... + 85 °C
• pole width	1.28 mm/0.96 mm
• pole number	32/31
• material foundation- / measuring device	aluminum/rubber ferrite

magnetic range and angle measurement systems

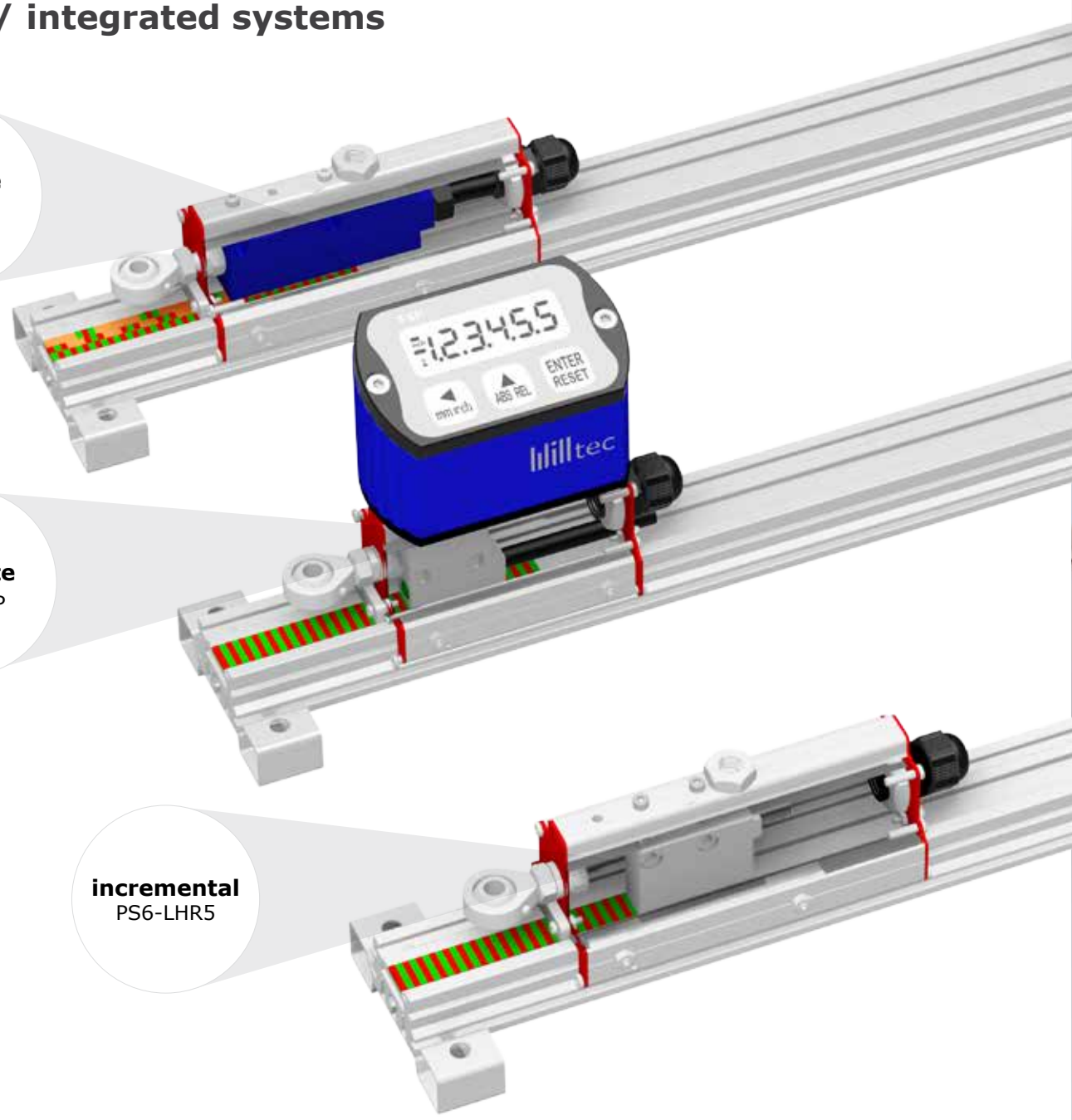
guided / integrated systems

slide guides

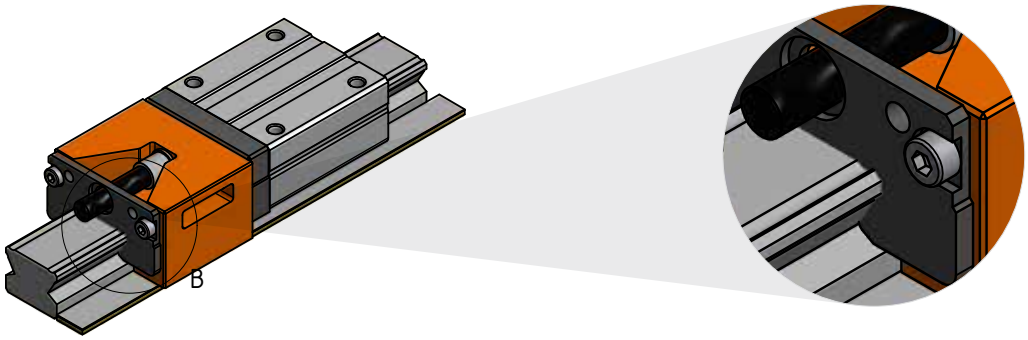
absolute
PS6-AMS2

quasi-absolute
PS6-F8P

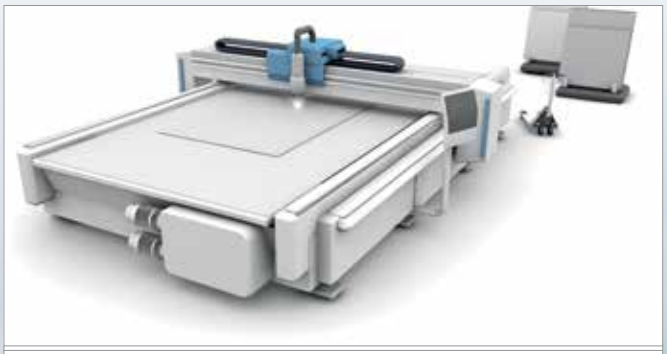
incremental
PS6-LHR5



ball caster guides



applications

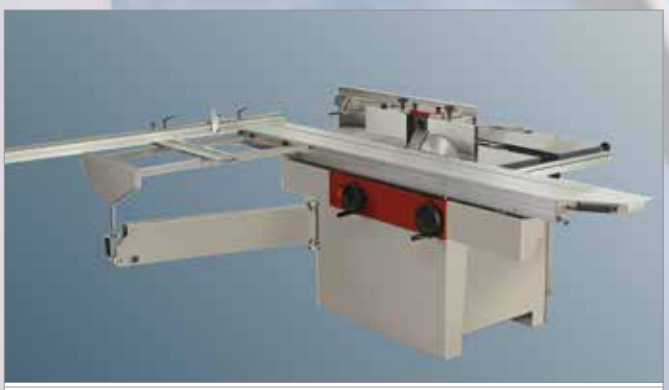


laser cutting station

calipers

rotational speed monitoring on wind power generators

linear slides



panel saws

electronic meter counters

optical scales

your advantages at a glance

- high accuracy
- easy mounting due to enclosed design
- dirt resistance

Our optical scales for incremental and absolute linear range measurements with various designs and accuracy classes are particularly suitable for the implementation in lathes, milling machines and other machine tools.

An optical scale is an optical range measuring system and consists out of a very finely divided ruler made out of sanded glass, occasionally from glass-like plastic. The advantage of glass and glass ceramics is the very low thermic expansion lowering the influence of varying temperatures on the dimensional accuracy.

We distribute optical scales from our industry representation of the company Givi-Misure from Northern Italy, who look back on decades-long experience in the development and production of optical scales. With these techniques resolutions of 0.1 µm and thereby accuracies of up to 1 µm can be achieved.

sectors

- machine tools
- press brakes
- measurement and control devices

product type	measuring principle	measuring length	maximum accuracy	maximum slit distance	maximum velocity	maximum acceleration	output
 **optical scale AGS**	absolute	up to 3 240 mm	± 1 µm	20 µm	120 m/min	30 m/s²	SSI, BiSS with or without analog 1 Vpp
 **optical scale GMS**	incremental	up to 30 040 mm	± 10 µm	40 µm	60 m/min	30 m/s²	Sinus 1 Vpp (V40) or Line Driver (T)
 **optical scale ISA 2320**	incremental	up to 4 000 mm	± 3 µm	20 µm	120 m/min	40 m/s²	NPN, Line Driver, PushPull
 **optical scale NCH**	incremental	up to 24 000 mm	± 5 µm	200 µm	300 m/min	60 m/s²	Line Driver (Tx) or Line Driver, PushPull (Wx)
 **optical scale NCS**	quasi-absolute	up to 3 240 mm	± 1 µm	20 µm	120 m/min	30 m/s²	Sinus 1 Vpp (V20) or Line Driver (Tx)
 **optical scale SCR3923**	incremental	up to 6 500 mm	± 3 µm	20 µm	120 m/min	30 m/s²	NPN, Line Driver, PushPull

optional accessory

3 axes display

mounting kit

mounting kit

optical scales for demanding conditions

PBS series

product type	measuring principle	measuring length	maximum accuracy	maximum slit distance	maximum velocity	maximum acceleration	output
 optical scale PBS-HR	incremental	up to 5 000 mm	± 2.5 µm	20 µm	80 m/min	30 m/s²	Line Driver, PushPull

GVS series

One model, four different designs. Suitable for applications with synchronized jaw benders, for example on press brakes.

GVS series – optical

product type	measuring principle	resolution	measuring support	degree of accuracy	grid size	IP-rating	output signal
 GVS 200	incremental	10-1-0.5-0.1 µ	glass	± 2.5 µm standard ± 1 µm high accuracy	20 µm	IP54 standard IP64 under pressure	Line Driver, PushPull
 GVS 204	absolute	1-0.1 µ	glass	± 2.5 µm standard ± 1 µm high accuracy	20 µm	IP54 standard IP64 under pressure	SSI-BiSS (with or without analog 1 Vpp signal)

GVS series – magnetic

product type	measuring principle	resolution	measuring support	degree of accuracy	grid size	IP-rating	output signal
 GVS 215	incremental	50-25-10-5-1 µ	plasto ferrites stainless steel strip	± 15 µm	2 + 2 mm	IP64 standard IP67 on request	Line Driver, PushPull
 GVS 219	absolute	100-50-10-5-1 µ	plasto ferrites stainless steel strip	± 15 µm	2 + 2 mm	IP64 standard IP67 on request	SSI-BiSS (with or without analog 1 Vpp signal)

applications

measuring and test benches

grinding machines

press brakes

draw-wire encoders

WSD and WSA designs

WSG design

When it comes to simple and reliable length measurements and length positioning, draw-wire encoders are the ideal measuring system.

Draw-wire encoders are sensors of highest linearity for dynamic industrial applications under tough conditions. Their housings are robust and double ball bearing mounted. They are installed via threads or borings in the floor panels. Different housing sizes for different measurement ranges make various different measurement tasks possible. The measurement range is between 50 mm and 12 000 mm. Various outputs (1 kΩ - 0 … 10 V – 4 … 20 mA – TTL – digital-absolute and many more) ensure connectivity to all common controls or displays.

The most common applications are:
mechanical engineering, medicine technology, storehouse and conveyor technology, lifts, gantry cranes, synchronous monitoring, assembly technology for automobile industry and heavy engineering, etc.

your advantages at a glance

- simple installation
- high dynamics
- measuring wire made out of stainless steel
- variable analog and digital outputs
- high reliability
- special designs
- IP-rating up to IP 68 or ATEX

sectors

- crane technology
- assembly technology
- lifting technology

analog – absolute (potentiometric)

product type	measuring principle	signal output	measuring length	linearity	IP-rating	temperature range
 **draw-wire encoder PF50 / 900**	potentiometric	resistance 10 kΩ ± 10 %	max. 920 mm	± 0.15 %	IP54	-10 °C to 70 °C
 **draw-wire encoder PF**	potentiometric	resistance 10 kΩ ± 10 %	max. 2 200 mm	± 0.25 %	IP54	-10 °C to 70 °C
 **draw-wire encoder PFA / 2.000**	potentiometric	resistance 10 kΩ ± 10 %	max. 2 000 mm	± 0.25 %	IP54	-10 °C to 70 °C
 **draw-wire encoder PFA / 12.000**	potentiometric	resistance 10 kΩ ± 10 %	max. 12 200 mm	± 0.25 %	IP54	-10 °C to 70 °C
 **draw-wire encoder WSA50 analog**	potentiometric	1 kΩ 0 - 10 V 4 - 20 mA	max. 1 250mm	± 0.02 %	IP65	-20 °C to 80 °C
 **draw-wire encoder WSA80 analog**	potentiometric	1 kΩ 0 - 10 V 4 - 20 mA	max. 3 000mm	± 0.02 %	IP65	-20 °C to 80 °C
 **draw-wire encoder WSA120 analog**	potentiometric	1 kΩ 0 - 10 V 4 - 20 mA	max. 6 000mm	± 0.02 %	IP65	-20 °C to 85 °C

draw-wire encoders

digital – absolute

product type	measuring principle	signal output	measuring length	resolution	IP-rating	temperature range
 **draw-wire encoder EF500 / 900**	incremental	resistance 10 kΩ ± 10 %	max. 920 mm	± 0.15 %	IP54	-10 °C to 70 °C
 **draw-wire encoder EF 3.200**	incremental	PP TTL	max. 3 200 mm	± 0.15 %	IP54	-10 °C to 70 °C
 **draw-wire encoder EFA**	incremental	PP TTL	max. 12 200 mm	± 0.15 %	IP54	-10 °C to 70 °C
 **draw-wire encoder EFM**	incremental / magnetic	PP	max. 920 mm	± 0.15 %	IP54	-10 °C to 70 °C
 **draw-wire encoder WSD50 digital**	incremental	PP TTL	max. 1 250mm	± 0.02 %	IP65	-20 °C to 80 °C
 **draw-wire encoder WSD80 digital**	incremental	PP TTL	max. 3 000mm	± 0.02 %	IP65	-20 °C to 80 °C
 **draw-wire encoder WSD120 digital**	incremental	PP TTL	max. 6 000mm	± 0.02 %	IP65	-20 °C to 80 °C

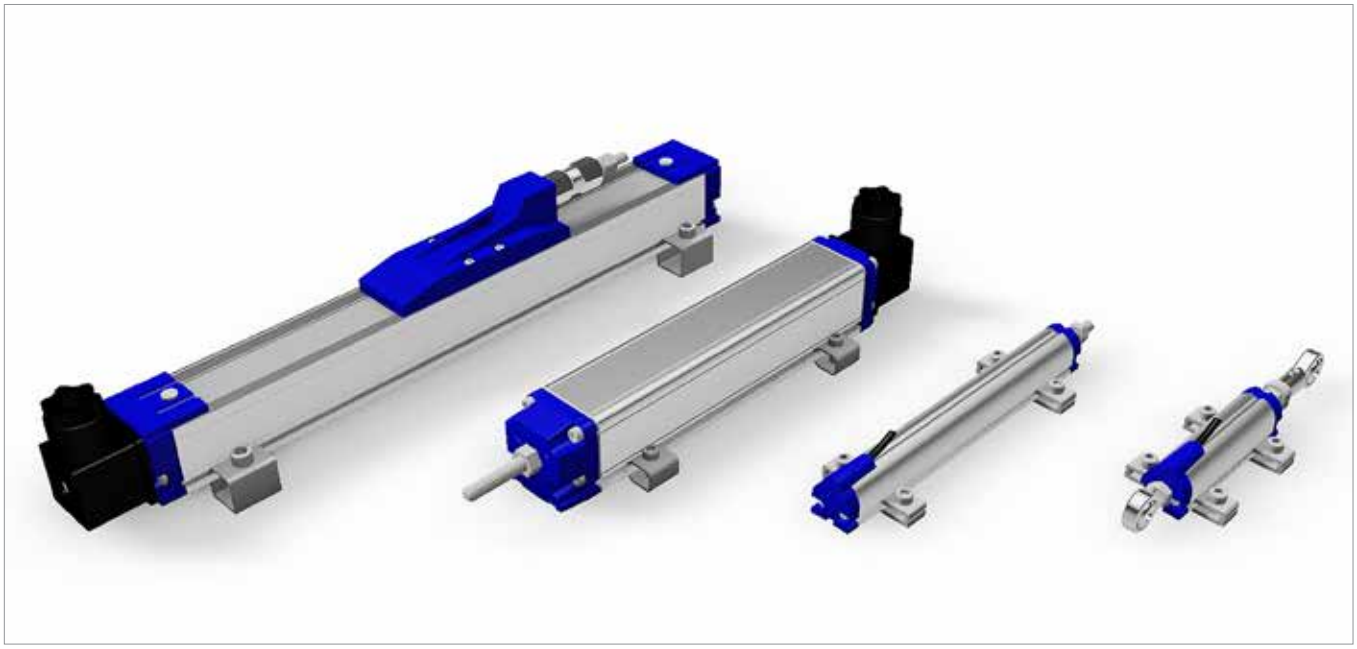
product type	measuring principle	signal output	measuring length	resolution	IP-rating	temperature range
 **draw-wire encoder WSG04**	incremental absolute	PP TTL SSI CANopen Profibus DP	max. 4 000 mm	–	IP51	-20 °C to 80 °C
 **draw-wire encoder WSG08**	incremental absolute	PP TTL SSI CANopen Profibus DP	max. 8 000 mm	–	IP51	-20 °C to 80 °C
 **draw-wire encoder WSG10**	incremental absolute	PP TTL SSI CANopen Profibus DP	max. 10 000 mm	–	IP51	-20 °C to 80 °C

applications

aerial work platforms

crane supports

linear potentiometers



linear potentiometers
Willtec linear potentiometers (WLP) are available in different sizes and designs and represent a cheap measuring method for the detection of positions and recording of linear movements. Due to their high variance, it is possible to monitor a multitude of applications with measuring ranges between 30 mm and 1 750 mm and thanks to various ways of mounting the devices our potentiometers can be deployed in diverse applications. Our linear potentiometers stand out through top-quality and simplify technology and construction while maintaining extremely high precision and accuracy.

sectors
• injection molding machines • bending machines • presses

you advantages at a glance
• cost-effective measurements • simple technology • diverse designs

standard series

product type	linearity (accuracy)	repeatability	measuring length	resolution	resistance	lifetime	IP-rating	dimensions / material
 **WLP-L-MQF2**	± 0.05 %	< 0.01 mm	30 - 1 250 mm	unlimited endless infinite	5 kΩ 10 kΩ	100 Mio. movements	IP65	housing 33x33 mm aluminum, anodized piston rod Ø6 mm stainless steel
 **WLP-L-MQF2**	± 0.05 %	< 0.01 mm	100 - 1 500 mm	unlimited endless infinite	5 kΩ 10 kΩ 20 kΩ (only with 1 500 mm)	100 Mio. movements	IP40 IP53 (for bottom-up installation)	housing 33x33 mm aluminum, anodized
 **WLP-C-LRS1/2**	± 0.05 %	< 0.01 mm	50 - 700 mm	unlimited endless infinite	5 kΩ 10 kΩ	100 Mio. movements	IP65	housing Ø38 mm aluminum, anodized piston rod Ø10 mm stainless steel
 **WLP-M-MQS1/2**	± 0.05 %	< 0.01 mm	50 - 600 mm	unlimited endless infinite	5 kΩ 10 kΩ	100 Mio. movements	IP65	housing 33x33 mm aluminum, anodized piston rod Ø6 mm stainless steel
 **WLP-S-MQT2**	± 0.05 %	< 0.01 mm	30 - 150 mm	unlimited endless infinite	5 kΩ 10 kΩ	100 Mio. movements	IP54	housing 33x33 mm aluminum, anodized piston rod Ø6 mm stainless steel
 **WLP-K-MQS1**	± 0.05 %	< 0.01 mm	30 - 1 250 mm	unlimited endless infinite	5 kΩ 10 kΩ	100 Mio. movements	IP65	housing 33x33 mm aluminum, anodized piston rod Ø6 mm stainless steel

linear potentiometers

the small ones

product type	linearity (accuracy)	repeatability	measuring length	resolution	resistance	lifetime	IP-rating	dimensions / material
 **WLP-T-SRS1**	± 0.05%	< 0.01 mm	10 - 400 mm	unlimited endless infinite	5 kΩ 10 kΩ 2 kΩ (only with 10 -25 mm)	100 Mio. movements	IP65	housing Ø18 mm aluminum, anodized piston rod Ø5 mm stainless steel
 **WLP-T-SQF1**	± 0.05%	< 0.01 mm	10 - 25 mm	unlimited endless infinite	2 kΩ 5 kΩ	50 Mio. movements	IP63	housing 13 x 16 mm aluminum, anodized piston rod Ø4 mm stainless steel
 **WLP-S-SRT1**	± 0.05%	< 0.01 mm	10 - 100 mm	unlimited endless infinite	5 kΩ 10 kΩ 2 kΩ (only with 10 -25 mm)	100 Mio. movements	IP65	housing Ø18 mm aluminum, anodized piston rod Ø5 mm stainless steel
 **WLP-C-SRS1**	± 0.05%	< 0.01 mm	10 - 300 mm	unlimited endless infinite	5 kΩ oder 10 kΩ 2 kΩ (only with 10 -25 mm)	100 Mio. movements	IP65	housing Ø18 mm aluminum, anodized piston rod Ø5 mm stainless steel
 **WLP-IS-SRT1**	± 0.05%	< 0.01 mm	10 - 50 mm	unlimited endless infinite	2 kΩ	100 Mio. movements	IP65	housing Ø18 mm aluminum, anodized piston rod Ø5 mm stainless steel

optional accessory

displays

guide elements

mounting clamps

with interfaces

product type	linearity (accuracy)	repeatability	measuring length	resolution	current / voltage	lifetime	IP-rating	dimensions / material
 **WLP-L-MQF2**	± 0.05 %	< 0.01 mm	30 - 1 000 mm	settable	4 - 20 mA 0 - 20 mA 0 - 10 V	100 Mio. movements	IP65	housing 33x33 mm aluminum, anodized piston rod Ø6 mm stainless steel
 **WLP-H-MQF2**	± 0.05 %	< 0.01 mm	100 - 1 500 mm	unlimited endless infinite	4 - 20 mA 0 - 20 mA 0 - 10 V	100 Mio. movements	IP40 IP53 (for bottom-up installation)	housing 33x33 mm aluminum, anodized
 **WLP-C-LRS1/2**	± 0.05 %	< 0.01 mm	50 - 700 mm	unlimited endless infinite	4 - 20 mA 0 - 20 mA 0 - 10 V	100 Mio. movements	IP65	housing Ø38 mm aluminum, anodized piston rod Ø10 mm stainless steel
 **WLP-M-MQS2**	± 0.05 %	< 0.01 mm	50 - 600 mm	settable	4 - 20 mA 0 - 20 mA 0 - 10 V	100 Mio. movements	IP65	housing 33x33 mm aluminum, anodized piston rod Ø6 mm stainless steel

applications

triple-roll bending machine

injection molding machine

micropulse transducers

Magnetostrictive distance measurement systems made by our partner Balluff have gained a firm foothold in the sector of plant engineering and automation. Typical fields of application of magnetostrictive micropulse transducers are tasks where high reliability and precision are necessary. Integrable or compact designs and measuring lengths between 25 mm and 7 600 mm make these distance measurement systems universally applicable.

Contactless, precise and absolute measurements are convincing reasons for the broad industrial application of linear, magnetostrictive transducers. Expensive service calls and inconvenient downtime are avoided through the contactless and wear-free method. The operational principle allows placing the devices in hermetically sealed housings, since the current position is transferred through the housing wall to the inset sensor via magnetic fields without direct contact. In principle, it is possible to measure multiple positions with one measuring system simultaneously. Magnetostrictive distance measurement systems attain IP-ratings IP67 and IP69K without laborious, complex and error-prone sealing concepts. Their high resistance against shock and vibration loads further extends their industrial field of application into the area of heavy machines and plant engineering. The measured values and position data which are available as absolute values immediately after the startup of the system are mandatory for many applications and increase the machine availability significantly by omitting reference runs.

sectors
• machine tools and injection molding machines • machine presses • straightening machines • packaging machines • handling

your advantages at a glance
• robust • wear-free • easy installation • high protection class / codes • diverse interfaces

operating principle

The measuring element, a waveguide, is made out of a special nickel-iron-alloy with 0.7 mm outside diameter and 0.5 mm inside diameter. A copper conductor is threaded through this pipe. The measurement is initiated by a short current pulse. This current creates a circular magnetic field which is concentrated on the waveguide because of its soft magnetic properties. A permanent magnet is placed as a position sensor at the measurement point. Its field lines run perpendicular to the magnetic field of the pulse and are also concentrated on the waveguide.

Because of magnetostriction, a micro scale elastic deformation which creates a mechanical wave spreading in both directions occurs in the waveguide section where both magnetic fields overlap. The propagation velocity of this wave is 2830 m/s and is mostly insensitive against environmental influences (e. g. temperature, vibration, staining). The wave propagating towards the end of the waveguide fades there, while the wave propagating towards the transducer creates an electric signal by reversing the magnetostrictive effect. The wave travel time from the point of origin to the transducer is directly proportional to the distance between permanent magnet and transducer. This distance can be measured via time measurement with high accuracy.

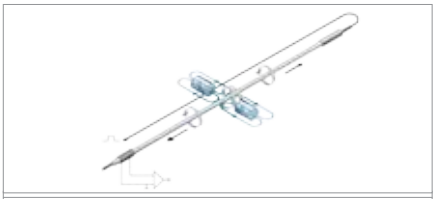
rod designs

The most common application of rod designs is in hydraulic actuators. The placement inside the pressurized portion of the hydraulic cylinder requires the same pressure resistance from the position sensors as from the hydraulic cylinder itself. In practice, these pressures reach up to 1 000 bar. The electronics are placed in a housing made out of aluminum or stainless steel, the waveguide in a pressure-resistant pipe out of non-magnetic stainless steel which is closed by a plug welded on its front side and a flange on the opposite side which seals the high pressure section with an O-ring seal. A position sensor ring with inlayed magnets glides above the pipe or rod to mark the position which is to be measured.

profile designs

The electronics and the measuring section are placed inside an aluminum profile. This aluminum profile is a hermetically sealed housing with IP-rating IP67. The magnets of the position sensor affect the waveguide through the wall of the aluminum profile.

Position sensors are available in a guided or freely moving variant. Freely moving position sensors are directly fixed to the moving machine part which is to be measured and jointly move in a certain distance over and along the profile. The advantage of this method is low requirements toward guidance precision: the sensors tolerate lateral and vertical offset of up to a few millimeters. Where even these generous tolerances cannot be maintained guided position sensors provide a solution. Here, the profile housing of the distance sensor also acts as rail for the position sensors slide. In this case even strong counter-directed movements are compensated by ball joints on a rod.



magneto strictive principle

rod design / rod + position sensor

**profile design /
profile + guide rod + position sensor**

micropulse transducers

profile micropulse transducers

product type	measuring length	accuracy	resolution	position sensor	connection method	interfaces
 **profile P**	50 to 7 620mm (5mm steps)	up to < 10 µm	up to 1 µm	independent/ guided	bare cable end/ plug socket	analog, SSI, CANopen, DeviceNet, Profibus-DP
 **profile PF**	50 to 4 572mm (5mm steps)	up to < 10 µm	up to 1 µm	independent/ guided	bare cable end/ plug socket	analog
 **profile AT A1**	50 to 1 500mm (5mm steps)	up to < 10 µm	up to 1 µm	independent	bare cable end/ plug socket	analog, digital pulse interfaces, Ethernet interface
 **profile BIW P1**	75 to 750mm	up to < 100 µm	up to 100 µm	guided thrust rod	open cable end/ plug socket	Analog

rod micropulse transducers

product type	measuring length	accuracy	resolution	position sensor	connection method	interfaces
 **rod (B, A, Z or Y)**	25 to 7 620 mm in 1-mm steps	up to < 10 µm	up to 1 µm	independent/ guided multi-position sensor	bare cable end/ plug socket	analog, SSI, CANopen, Profibus-DP, start-/stop-pulse interface
 **rod Compact (H, K or W)**	25 to 7 620 mm in 1-mm steps	up to < 10 µm	up to 1 µm	independent/ guided	bare cable end/ plug socket	analog, SSI, CANopen
 **rod Pro Compact (HB or WB)**	25 to 5.500 mm in 1-mm steps	up to < 10 µm	up to 1 µm	independent/ guided	bare cable end/ plug socket	analog, SSI, CANopen, start-/ stop-pulse interface
 **rod AR (E2 / E28)**	50 to 1.524 mm in 1-mm steps	up to < 10 µm	up to 1 µm	independent/ guided	bare cable end/ plug socket	analog, start-/stop-pulse interface

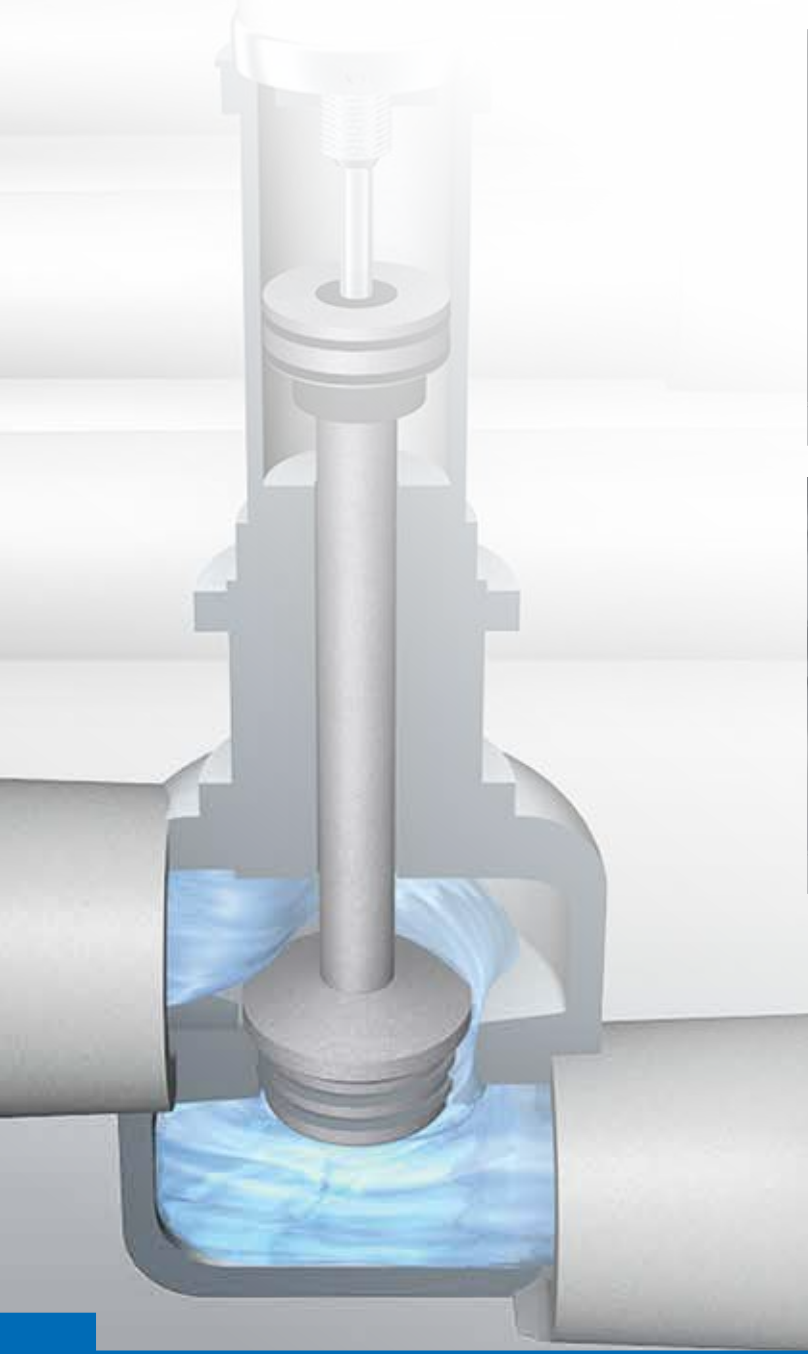
EX micropulse transducers

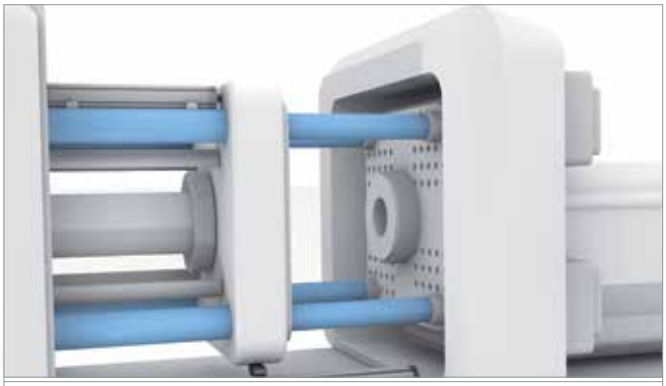
product type	measuring length	accuracy	resolution	position sensor	connection method	interfaces
 **rod DEX B, J or Z**	25 to 4 000 mm in 1-mm steps	up to < 10 µm	up to 1 µm		bare cable end	analog, digital pulse interface, SSI
 **rod J-DEXC TA12**	25 to 4 000 mm in 1-mm steps	up to < 10 µm	up to 1 µm		bare cable end	analog, SSI, CANopen, Profibus-DP
 **rod NEX**	25 to 4 500 mm in 1-mm steps	up to < 10 µm	up to 1 µm		bare cable end	analog
 **rod PEX**	25 to 5 500 mm in 1-mm steps	up to < 10 µm	up to 1 µm		bare cable end	digitale pulse interface

applications

examination of process movements

filling processes





observation of closing movements

controlling of injection molding unit

inclination sensors

Precise position monitoring and continuous adjustments of rotational movements play an important role in many applications. Inclinometers measure the deviation relative to the horizontal plane of up to 360° on one axis. They are deployable in temperatures up to -40 °C, require only little room and have a robust metal housing.

sectors
• wind and solar power • medicine technology • oil and gas production • handling

your advantages at a glance
• easy handling • high precision • robust housing

optional accessory

displays

connectors and cables

power units

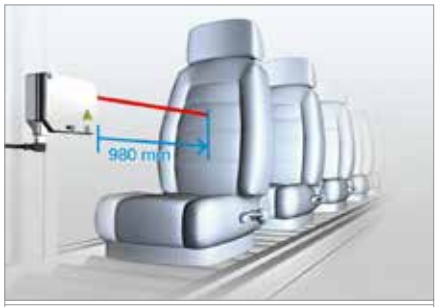
inclination sensors

product type	version	output signal	measure-ment range	accuracy	resolution	operating voltage	housing material	operating temperature
 **IM 60**	single axis	4-20 mA to 0-10 Vcc	±45° ±60°	±0.5° ±1.0°	±0.1°	24 VDC ±20 % max. 150 mA	ABS	-10° to 70° C
 **IM 60-2**	dual axes	4-20 mA to 0-10 Vcc	±60°	±0.6°	±0.1°	24 VDC ±20 % max. 150 mA	ABS	-10° to 70° C
 **IM 360**	single axis	4-20 mA to 0-10 Vcc	0 - 360°	±0.6°	±0.1°	24 VDC ±20 % max. 150 mA	ABS	-10° to 70° C
 **BSI-R11 AO**	single axis	4 ... 20 mA Modbus RTU RS-485	0 ... 360°	±0.1° (min. 0.1°)	±0.01°	10 ... 30 VDC	aluminum	-40° to 85° C
 **BSI-Q41 KO**	single axis dual axes	4 ... 20 mA 0 ... 10 V 4 ... 20 mA 0 ... 10 V	±15° ±30° ±45° ±90° ±180° ±15° ±30° ±45° ±90°	0.6° 0.6° 0.8° 0.8° 1.0° 0.6° 0.6° 0.8° 0.8°	0.09° 0.09°	10 ... 30 VDC 12 ... 30 VDC 10 ... 30 VDC 12 ... 30 VDC	PBTP PBTP	-25° to 85° C -25° to 85° C
 **BSI-R65 KO**	single axis dual axes	4 ... 20 mA 0 ... 10 V 4 ... 20 mA 0 ... 10 V	±15° ±30° ±45° ±90° ±180° ±15° ±30° ±45° ±90°	0.2° 0.2° 0.2° 0.2° 0.25° 0.08° 0.2° 0.2° 0.2°	0.01° 0.01°	10 ... 30 VDC 12 ... 30 VDC 10 ... 30 VDC 12 ... 30 VDC	PBTP PBTP	-40° to 85° C -40° to 85° C

distance sensors

Distance sensors of various designs are used if the distance to an object is measured or monitored or if its exact position has to be determined. Which technology (optical, inductive, capacitive, ultra-sonic) is used depends individually on the positioning task and the external conditions. We offer you suitable and inexpensive solutions for a large number of different positioning tasks starting from small lifts and going up to long distances (20 mm – 500 000 mm).

Choose a solution which is tailored exactly to your requirements!



WSG design

sectors	your advantages at a glance
• packaging and filling industry	• contactless and wear-free
• transport and conveyor industry	• high repeatability
• logistics	• absolute measurements
• handling / automation	• numerous different designs

optional accessory

displays

connectors / cables+ mounting brackets

power units

optical distance sensors XXL

Our Willtec distance laser (WDL) is a high precision and high performance optical measurement system which enables you to capture long distances (up to 500 m) even under tough conditions. A high variety of integrated features yields the desired flexibility for challenging applications.

measuring range: up to 500 m

accuracy: up to ± 1 mm

distance measurements – contact-free and reliable

product type	measurement range	resolution	reproducibility	measurement rate	operating temperature	interfaces	serial interfaces
 **WDL1-S**	0 ... 30 m	± 3 mm	± 1.5 mm	up to zu 3 Hz	-10 °C ... + 50 °C	0/4 ... 20 mA 0 - 10 V	
 **WDL1-M**	0 ... 150 m	± 1.5 mm	± 0.4 mm	up to zu 6 Hz	-40 °C ... + 50 °C	0/4 ... 20 mA 0 - 10 V 2 digital outputs	RS-232 RS-422 Profibus (option)
 **WDL1-L**	0 ... 500 m	± 1.0 mm	± 0.3 mm	up to zu 200 Hz	-40 °C ... + 50 °C	0/4 ... 20 mA 0 - 10 V 2 digital outputs	RS-232 RS-422 oder SSI Profibus (option)

applications

monitoring of railway infrastructure

position sensing of flood gates

truck positioning

optical distance sensors / standard

Optical distance sensors are used if distances between objects have to be measured or monitored through exact positioning. Distance measurements are based on the triangulation principle where the time of flight of light is measured. PSD-elements or CCD-arrays are used as receiving elements while red-light or laser light sources act as transmitters. Analog current and voltage values, serial interfaces as well as digital outputs are available to the users.

distance sensors BOD 6K

product type	order code	measurement range	operating range	illuminant	output	connectors
 **BOD 6K-RA01-S75-C**	BOD000H	60 mm	20 to 80 mm	red light	0 to 10 V, PNP	M8 plug, 4 pins
 **BOD 6K-RA01-C-02**	BOD000F	60 mm	20 to 80 mm	red light	0 to 10 V, PNP	cable

distance sensors BOD 21M laser

product type	order code	measurement range	operating range	illuminant	output	connectors
 **BOD 21M-LA01-S92**	BOD000L	20 mm	25 to 45 mm	laser light	1 to 10 V, 2 × PNP	M12 plug, 5 pins
 **BOD 21M-LB01-S92**	BOD000P	20 mm	25 to 45 mm	laser light	4 to 20 mA, 2 × PNP	M12 plug, 5 pins
 **BOD 21M-LA02-S92**	BOD000M	180 mm	20 to 200 mm	laser light	1 to 10 V, 2 × PNP	M12 plug, 5 pins
 **BOD 21M-LB02-S92**	BOD000R	180 mm	20 to 200 mm	laser light	4 to 20 mA, 2 × PNP	M12 plug, 5 pins
 **BOD 21M-LA04-S92**	BOD000N	480 mm	20 to 500 mm	laser light	1 to 10 V, 2 × PNP	M12 plug, 5 pins
 **BOD 21M-LB04-S92**	BOD000T	480 mm	20 to 500 mm	laser light	4 to 20 mA, 2 × PNP	M12 plug, 5 pins

distance sensors BOD 26K-LA laser

product type	order code	measurement range	operating range	illuminant	output	connectors
 **BOD 26K-LA01-S4-C**	BOD0002	40 mm	45 to 85 mm	laser light	0 to 10 V	M12 plug, 8 pins
 **BOD 26K-LA01-C-06**	BOD0001	40 mm	45 to 85 mm	laser light	0 to 10 V	cable

product type	order code	measurement range	operating range	illuminant	output	connectors
 BOD 26K-LA02-S4-C	BOD0004	40 mm	45 to 85 mm	laser light	0 to 10 V	M12 plug, 8 pins
 BOD 26K-LA02-C-06	BOD0003	40 mm	45 to 85 mm	laser light	0 to 10 V	cable

distance sensors BOD 26K-LB laser

product type	order code	measurement range	operating range	illuminant	output	connectors
 BOD 26K-LB04-S115-C	BOD0005	70 mm	30 to 100 mm	laser light	4 to 20 mA, 2 × PNP	M12 plug, 8 pins
 BOD 26K-LBR04-S115-C	BOD000C	70 mm	30 to 100 mm	laser light	RS485, 4 to 20 mA, 2 × PNP	M12 plug, 8 pins
 BOD 26K-LB05-S115-C	BOD0006	220 mm	80 to 300 mm	laser light	4 to 20 mA, 2 × PNP	M12 plug, 8 pins
 BOD 26K-LBR05-S115-C	BOD000E	220 mm	80 to 300 mm	laser light	RS485, 4 to 20 mA, 2 × PNP	M12 plug, 8 pins
 BOD 26K-LB06-S92-C	BOD0007	70 mm	30 to 100 mm	laser light	4 to 20 mA, PNP	M12 plug, 5 pins
 BOD 26K-LB07-S92-C	BOD0008	220 mm	80 to 300 mm	laser light	4 to 20 mA, PNP	M12 plug, 5 pins

distance sensors BOD 63M laser

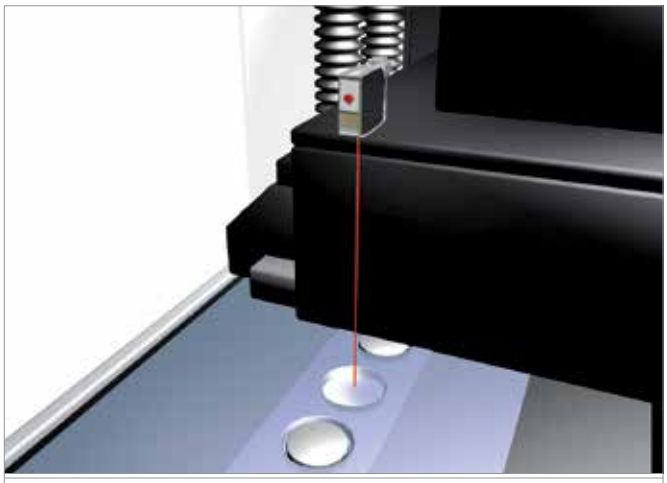
product type	order code	measurement range	operating range	illuminant	output	connectors
 BOD 63M-LA02-S115	BOD000U	1 800 mm	200 to 2 000 mm	laser light	0 to 10 V, 2 × PNP, alert output	M12 plug, 8 pins
 BOD 63M-LB02-S115	BOD0010	1 800 mm	200 to 2 000 mm	laser light	0 to 10 V, 2 × PNP, alert output	M12 plug, 8 pins
 BOD 63M-LI06-S4	BOD0012	5 800 mm	200 to 6 000 mm	red light, laser light	IO-link	M12 plug, 4 pins
 BOD 63M-LA04-S115	BOD000W	5 800 mm	200 to 6 000 mm	laser light	0 to 10 V, 2 × PNP, alert output	M12 plug, 8 pins
 BOD 63M-LB04-S115	BOD0011	5 800 mm	200 to 6 000 mm	laser light	0 to 20 V, 2 × PNP, alert output	M12 plug, 8 pins

distance sensors

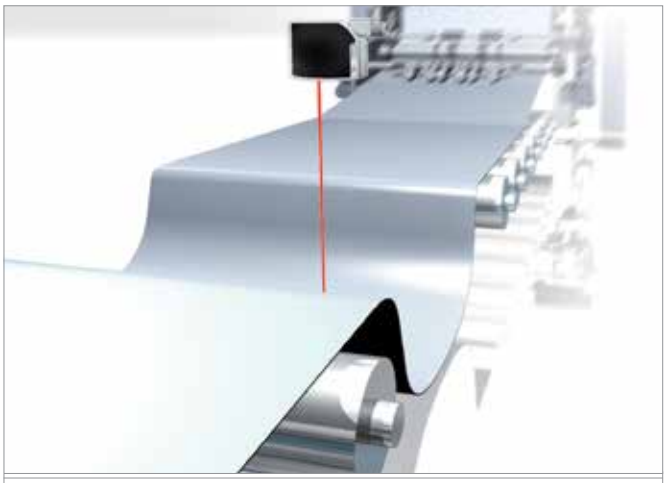
distance sensors BOD 66M-R

product type	order code	measurement range	operating range	illuminant	output	connectors
 **BOD 66M-RA01-S92-C**	BOD0015	500 mm	100 to 600 mm	red light	1 to 10 V, PNP	M12 plug, 8 pins
 **BOD 66M-RB01-S92-C**	BOD0016	500 mm	100 to 600 mm	red light	4 to 20 mA, 2 × PNP	M12 plug, 8 pins
 **BOD 66M-LA04-S92-C**	BOD0013	1 b800 mm	200 to 2 000 mm	laser light	1 to 10 V, PNP	
 **BOD 66M-LB04-S92-C**	BOD0014	1 800 mm	200 to 2 000 mm	laser light	4 to 20 mA, PNP	M12 plug, 8 pins

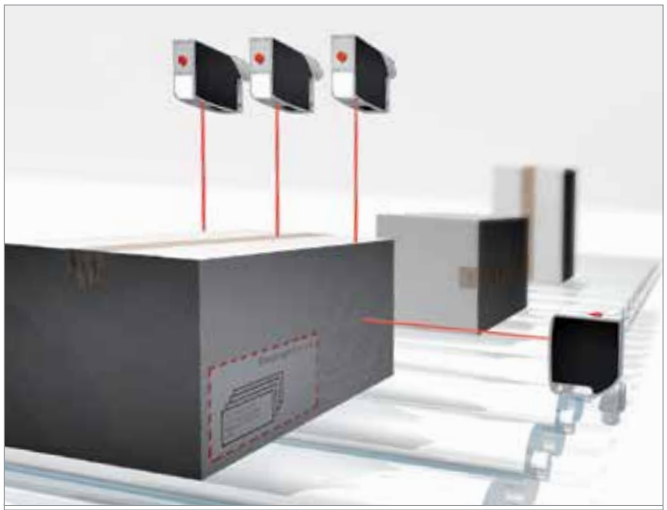
applications



blister package



passage control



adaptive feeding

contour control

ultrasonic distance sensors

Ultrasonic distance sensors work very well for distance sensing or position detection of granulates, fluids or powders. They measure fill levels, heights or sag, control pressence and count objects without physical contact. They are universally applicable, regardless of colour or surface qualities. Even transparent objects with high reflectance don‘t affect the measurements. Ultrasonic distance sensors are precise all-rounders wich stand out especially under tough conditions and maintain functional reliability even in dusty, dirty or foggy environments.

Their detection range covers 20 mm to 8 m so even large object distances don‘t pose an obstacle. High resolution and small blind zones yield extreme precision. Mutual interference of the sensors is impossible due to integrated synchronization.

Our ultrasonic distance sensors vary through their output signals. Each series comes in switch or analog design, while all analog versions are available with current or voltage output (0...10 or 4...20 mA respectively). Additionally the M30 series comprises variants with two switch outputs, switch and analog output as well as two switch outputs and one analog output, so that one sensor can assume the functionality of a second one.

cylinder design, M30 analog output

product type	order code	dimensions	blind zone / limit switch range	resolution	output signal	repeatability / accuracy
 **BUS M30M1-XC-03/0,25-S92K**	BUS002N	M 30x1	0 ... 30 mm / 350 mm	0.025 ... 0.10 mm	0 ... 10 V/ 4 ... 20 mA	±0.15% / ±1% (temperature drift compensated internally)
 **BUS M30M1-XC-07/035-S92K**	BUS005K	M 30x1	0 ... 65 mm / 600 mm	0.025 ... 0.17 mm	0 ... 10 V/ 4 ... 20 mA	±0.15% / ±1% (temperature drift compensated internally)
 **BUS M30M1-XC-20/130-S92K**	BUS003F	M 30x1	0 ... 200 mm / 2 000 mm	0.18 ... 0.57 mm	0 ... 10 V/ 4 ... 20 mA	±0.15% / ±1% (temperature drift compensated internally)
 **BUS M30M1-XC-35/340-S92K**	BUS003T	M 30x1	0 ... 350 mm / 5 000 mm	0.18 ... 1.5 mm	0 ... 10 V/ 4 ... 20 mA	±0.15% / ±1% (temperature drift compensated internally)
 **BUS M30M1-XC-60/600-S92K**	BUS0041	M 30x1	0 ... 600 mm / 8 000 mm	0.18 ... 2.4 mm	0 ... 10 V/ 4 ... 20 mA	±0.15% / ±1% (temperature drift compensated internally)

optional accessory

displays

connectors / cables + mounting bracket

power units

distance sensors

cylinder design, M30 switch and analog output

product type	order code	dimensions	blind zone / limit switch range	resolution	output signal	repeatability / accuracy
 **BUS M30M1-PPC-03/0,25-S92K**	BUS002L	M 30x1	0 ... 30 mm / 350 mm	0.025 ... 0.10 mm	0 ... 10 V/ 4 ... 20 mA PNP, closer/ opener	±0.15% / ±1% (temperature drift compensated internally)
 **BUS M30M1-PPC-07/035-S92K**	BUS005M	M 30x1	0 ... 65 mm / 600 mm	0.025 ... 0.17 mm	0 ... 10 V/ 4 ... 20 mA PNP, closer/ opener	±0.15% / ±1% (temperature drift compensated internally)
 **BUS M30M1-PPC-20/130-S92K**	BUS0038	M 30x1	0 ... 200 mm / 2 000 mm	0.18 ... 0.57 mm	0 ... 10 V/ 4 ... 20 mA PNP, closer/ opener	±0.15% / ±1% (temperature drift compensated internally)
 **BUS M30M1-PWC-20/130-S92K**	BUS003N	M 30x1	0 ... 200 mm / 2 000 mm	0.18 ... 0.57 mm	0 ... 10 V/ 4 ... 20 mA 2xPNP, closer/ opener	±0.15% / ±1% (temperature drift compensated internally)
 **BUS M30M1-PPC-35/340-S92K**	BUS003L	M 30x1	0 ... 350 mm / 5 000 mm	0.18 ... 1.5 mm	0 ... 10 V/ 4 ... 20 mA PNP, closer/ opener	±0.15% / ±1% (temperature drift compensated internally)
 **BUS M30M1-PWC-35/340-S92K**	BUS0044	M 30x1	0 ... 350 mm / 5 000 mm	0.18 ... 1.5 mm	0 ... 10 V/ 4 ... 20 mA 2xPNP, closer/ opener	±0.15% / ±1% (temperature drift compensated internally)
 **BUS M30M1-PPC-60/600-S92K**	BUS0043	M 30x1	0 ... 600 mm / 8 000 mm	0.18 ... 2.4 mm	0 ... 10 V/ 4 ... 20 mA PNP, closer/ opener	±0.15% / ±1% (temperature drift compensated internally)

applications

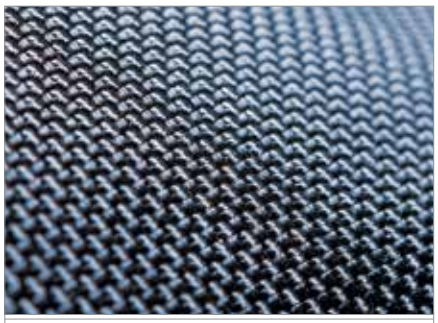
colours

filling and packaging

fluids

contrasts

bulk cargo surfaces

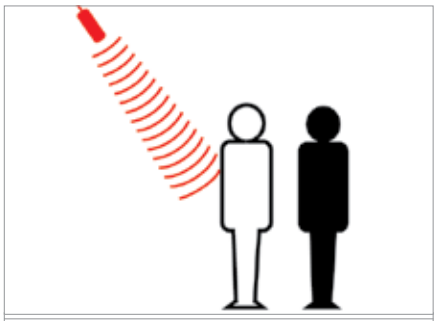


textile surfaces

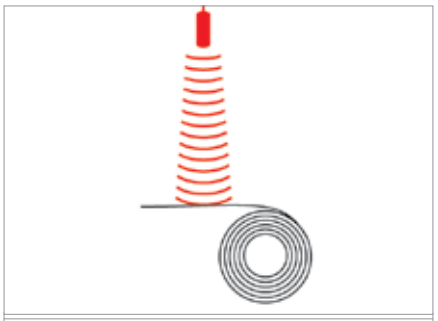
applications

handling and automation

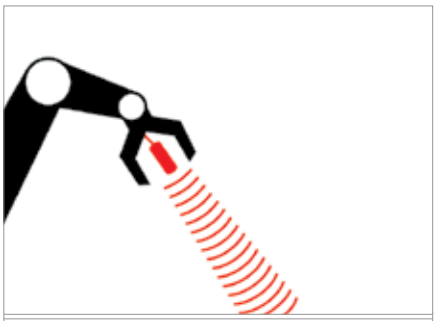
ultrasonic distance sensors – multifaceted application



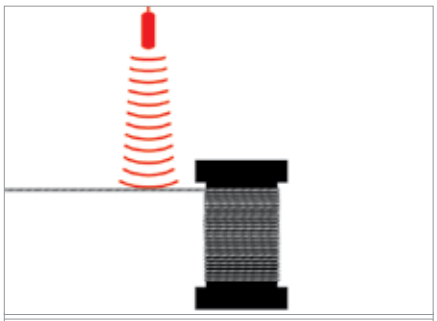
person recognition



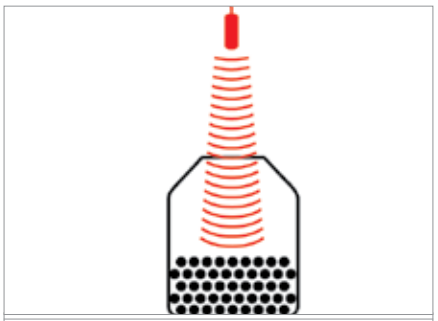
web tear monitoring



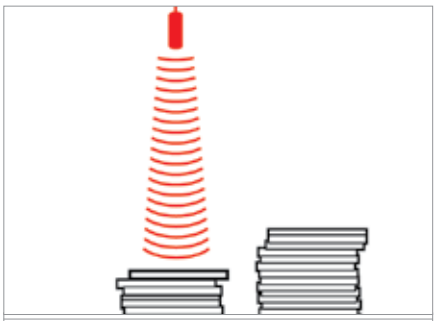
robot positioning



wire tear monitoring



filling level monitoring



stack height detection

inductive distance sensors

Inductive distance sensors deliver an absolute voltage or current signal, which varies proportionally to the distance to a metallic target. Workpieces of variable shape and size made out of ferritic or non ferritic material dampen the sensor in different manners. Through this position, distance and material can be detected in the most easy way.

cylinder designs, Ø 6.5 mm

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
 **BAW G06EF-UAC20B-S49G**	BAW000L	Ø 6.5 mm	flush	0.5 to 2 mm	0 to 10 V	M8 connector
 **BAW G06EE-UAF20B-EP03-K**	BAW000J	Ø 6.5 mm	flush	0.5 to 2 mm	0 to 10 V	open cable end

cylinder designs, M8 × 1

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
 **BAW M08EI-UAD15B-BP00.2-GS04**	BAW000N	M8 × 1	flush	0.5 to 1.5 mm	0 to 10 V	M12 connector
 **BAW M08EH-UAD15B-S04G**	BAW003R	M8 × 1	flush	0.5 to 1.5 mm	0 to 10 V	M12 connector
 **BAW M08EF-UAC15B-S49G**	BAW000M	M8 × 1	flush	0.5 to 1.5 mm	0 to 10 V	M8 connector
 **BAW M08EI-UAD15B-BP03**	BAW000T	M8 × 1	flush	0.5 to 1.5 mm	0 to 10 V	open cable end
 **BAW M08EI-UAD25F-BP03**	BAW000W	M8 × 1	not flush	0.5 to 2.5 mm	0 to 10 V	open cable end

cylinder designs, M12 × 1

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
 **BAW M12MG2-ICC20B-BP00.2-GS04**	BAW001F	M12 × 1	flush	0.5 to 2 mm	4 to 20 mA	M12 connector
 **BAW M12MG2-ICC20B-BP03**	BAW001H	M12 × 1	flush	0.5 to 2 mm	4 to 20 mA	open cable end
 **BAW M12MG2-UAC20B-BP00.2-GS04**	BAW001J	M12 × 1	flush	0.5 to 2 mm	0 to 10 V	M12 connector

cylinder designs, M12 × 1

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
 **BAW M12MI-UAC20B-S04G**	BAW001P	M12 × 1	flush	0.5 to 2 mm	0 to 10 V	M12 connector
 **BAW M12ME-UAC20B-S04G**	BAW0010	M12 × 1	flush	0.5 to 2 mm	0 to 10 V	M12 connector
 **BAW M12MG2-UAC20B-BP03**	BAW001L	M12 × 1	flush	0.5 to 2 mm	0 to 10 V	open cable end
 **BAW M12MG2-IAC20B-BP00.2-GS04**	BAW0019	M12 × 1	flush	0.5 to 2 mm	4 to 20 mA	M12 connector
 **BAW M12MG2-IAC20B-BP03**	BAW001C	M12 × 1	flush	0.5 to 2 mm	4 to 20 mA	open cable end
 **BAW M12ME-UAD50B-BP01**	BAW0011	M12 × 1	quasi-flush	1 to 5 mm	0 to 10 V	open cable end
 **BAW M12MF2-UAC40F-BP00.2-GS04**	BAW0014	M12 × 1	not flush	1 to 4 mm	0 to 10 V	M12 connector
 **BAW M12MD-UAC40F-S04G**	BAW000Z	M12 × 1	not flush	1 to 4 mm	0 to 10 V	M12 connector
 **BAW M12MF2-UAC40F-BP03**	BAW0017	M12 × 1	not flush	1 to 4 mm	0 to 10 V	open cable end
 **BAW M12MH1-ICC40F-S04G**	BAW003N	M12 × 1	not flush	1 to 4 mm	4 to 20 mA	M12 connector

cylinder designs, M18 × 1

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
 **BAW M18ME-UAC50B-BP00,2-GS04**	BAW001Z	M18 × 1	flush	1 to 5 mm	0 to 10 V	M12 connector
 **BAW M18MI-UAC50B-S04G**	BAW002K	M18 × 1	flush	1 to 5 mm	0 to 10 V	M12 connector
 **BAW M18ME-UAE50B-S04G-K**	BAW0026	M18 × 1	flush	1 to 5 mm	0 to 10 V	M12 connector
 **BAW M18ME-UAC50B-S04G**	BAW0025	M18 × 1	flush	1 to 5 mm	0 to 10 V	M12 connector

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
 **BAW M18MI2-UAC50B-BP05-002**	BAW002M	M18 × 1	flush	1 to 5 mm	0 to 10 V	open cable end
 **BAW M18MM-UAZ50B-BP05-505**	BAW002U	M18 × 1	flush	1 to 5 mm	0 to 10 V	open cable end
 **BAW M18ME-UAC50B-BP03**	BAW0022	M18 × 1	flush	1 to 5 mm	0 to 10 V	open cable end
 **BAW M18MI-BLC50B-S04G**	BAW002F	M18 × 1	flush	1 to 5 mm	IO link, declining	M12 connector
 **BAW M18MI-IAC50B-S04G**	BAW002H	M18 × 1	flush	1 to 5 mm	4 to 20 mA	M12 connector
 **BAW M18MI-ICC50B-S04G**	BAW002J	M18 × 1	flush	1 to 5 mm	4 to 20 mA	M12 connector
 **BAW M18ME-ICC50B-S04G**	BAW001U	M18 × 1	flush	1 to 5 mm	4 to 20 mA	M12 connector
 **BAW M18ME-ICC50B-BP03**	BAW001T	M18 × 1	flush	1 to 5 mm	4 to 20 mA	open cable end
 **BAW M18MG-UAC80F-S04G**	BAW002C	M18 × 1	not flush	2 to 8 mm	0 to 10 V	M12 connector
 **BAW M18MG-UAC16F-S04G-K**	BAW0029	M18 × 1	not flush	4 to 16 mm	0 to 10 V	M12 connector

cylinder designs, M30 × 1,5

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
 **BAW M30ME-UAC10B-S04G**	BAW002W	M30 × 1,5	flush	2 to 10 mm	0 to 10 V	M12 connector
 **BAW M30ME-UAC15F-S04G**	BAW002Y	M30 × 1,5	not flush	3 to 15 mm	0 to 10 V	M12 connector

cylinder design, PG36

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
	BAW003M	PG36	flush	0 to 20 mm	0 to 10 V	M12 connector
BAW MKZ-471.19-S4						

cylinder design, high pressure resistant, M12 × 1

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
	BAW0040	M12 × 1	flush	0.5 to 2 mm	0 to 10 V	M12 connector
BAW Z08EO-UAD20B-S04G-H11						

rectangular designs, 10 × 30 × 6 mm

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
	BAW0030	10 × 30 × 6 mm	flush	1 to 4 mm	0 to 10 V	M5 connector
BAW R03KC-UAE40B-BP00,3-GS26						
	BAW0031	10 × 30 × 6 mm	flush	1 to 4 mm	0 to 10 V	M8 connector
BAW R03KC-UAE40B-BP00,3-GS49						
	BAW0032	10 × 30 × 6 mm	flush	1 to 4 mm	0 to 10 V	open cable end
BAW R03KC-UAE40B-BP03						

rectangular designs, 20 × 30 × 8 mm

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
	BAW0034	20 × 30 × 8 mm	flush	0.5 to 2 mm	0 to 10 V	M8 connector
BAW R06AC-UAF20B-S49G						
	BAW0033	20 × 30 × 8 mm	flush	0.5 to 2 mm	0 to 10 V	open cable end
BAW R06AC-UAF20B-EP03						

rectangular designs, 14 × 38.5 × 17 mm

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
	BAW003E	14 × 38.5 × 17 mm		1 to 5 mm	0 to 10 V	open cable end
BAW Z01AC-UAD50B-DP03-K						
	BAW003A	14 × 38.5 × 17 mm		1 to 5 mm	IO link, declining	open cable end
BAW Z01AC-BLD50B-DP03						
	BAW003W	14 × 38.5 × 17 mm		1 to 5 mm	IO link, declining	M12 connector
BAW Z05AC-BLD50B-BP00,75-GS04						

distance sensors

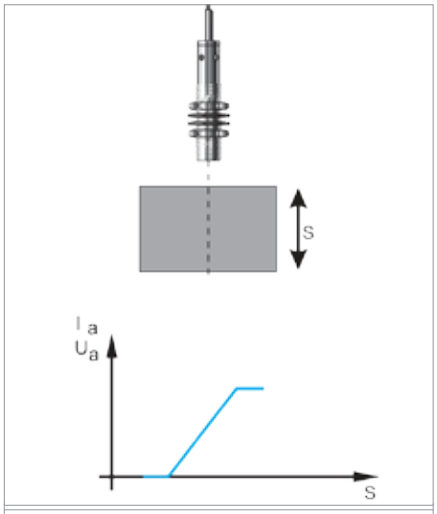
rectangular designs, 80 × 80 × 40 mm

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
 BAW MKK-050.19-S4	BAW003K	80 × 80 × 40 mm	not flush	0 to 50 mm	0 to 10 V	M12 connector

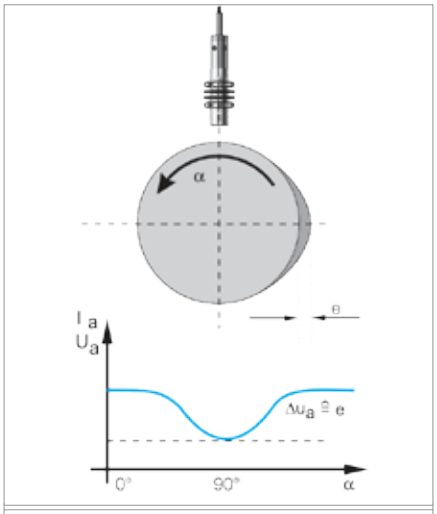
rectangular designs, 80 × 45 × 20 mm

product type	order code	dimensions	mechanical installation requirements	measurement range	output	connectors
 BAW MKV-020.19-S4	BAW003L	80 × 45 × 20 mm		0 to 60 mm	0 to 10 V	M12 connector

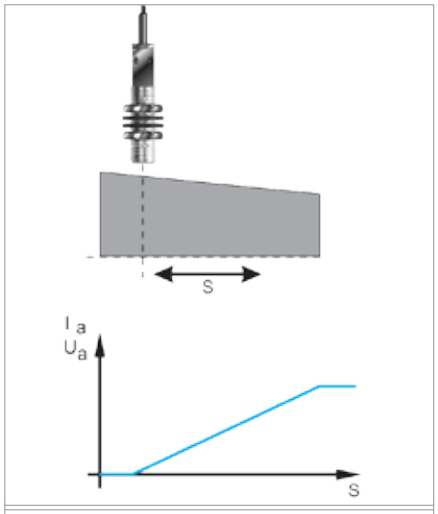
applications



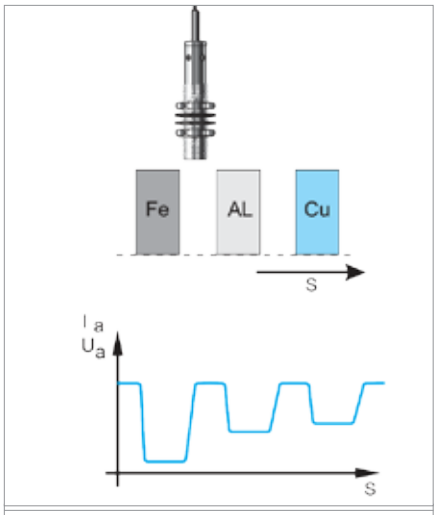
approximation in axial direction



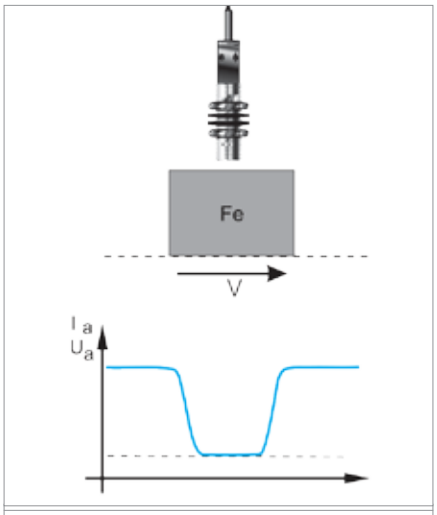
scanning of rotating objects



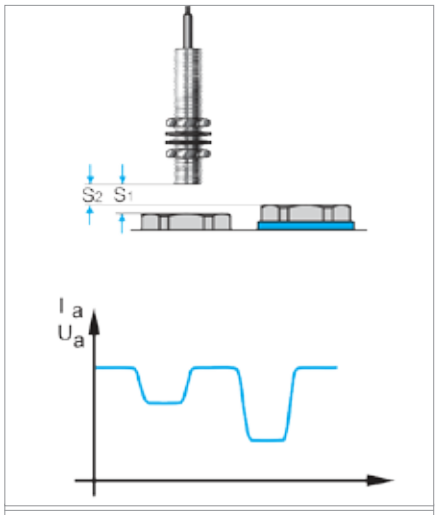
lateral approach



recognition of different materials



distance measurements during high process velocities of the object



detection of mounted sealing rings

capacitive distance sensors

Capacitive distance sensors scan objects without physical contact, so there‘s no mechanical wear of the scanned object. Object colour and surface qualities do not influence the measurement.

Technical details:
- adjustable measurement range 0...8 mm
- flush installation
- output signal, current 4...20 mA
- housing M8

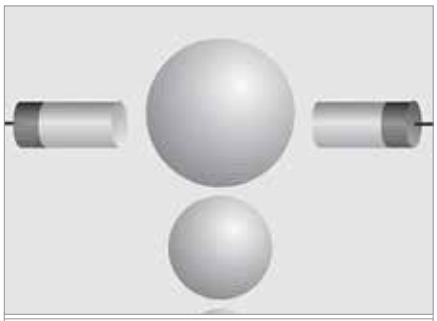
Capacitve distance sensors contact-freely detect objects which are within their measuring range.
As soon as the object enters this range, the electric field of the active surface and thereby the output current are altered. Through this, material properties, size and distance of the object to the active surface can be detected.

The output signal (4...20 mA) can be adjusted to the material via a potentiometer (LED shines green). Evaluation takes place directly at the analog output of the control.

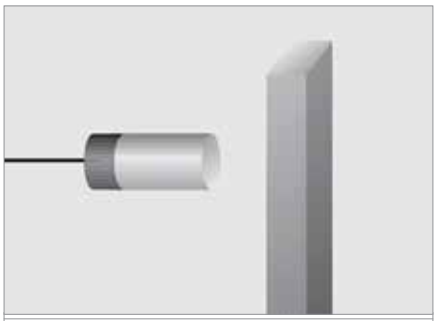
standard sensor, cylinder design, M18 x 1

product type	order code	dimensions	mechanical installation requirements	measurement range	output signal	connectors
 **BCW M18B4M1-ICM80C-DV02**	BCW0001	M18 x 1	flush	0 to 8 mm	4 to 20 mA	open cable end

applications



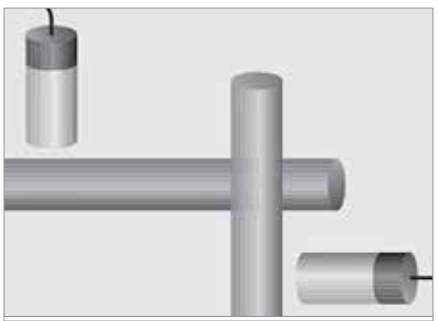
determination of diameters



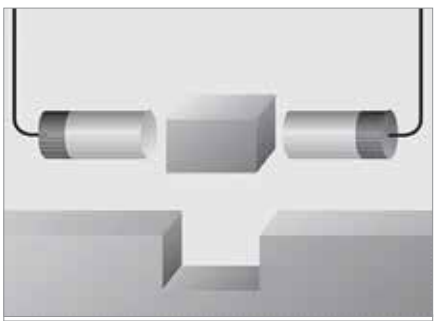
static / dynamic shifts

run-out monitoring

concentricity and eccentricity



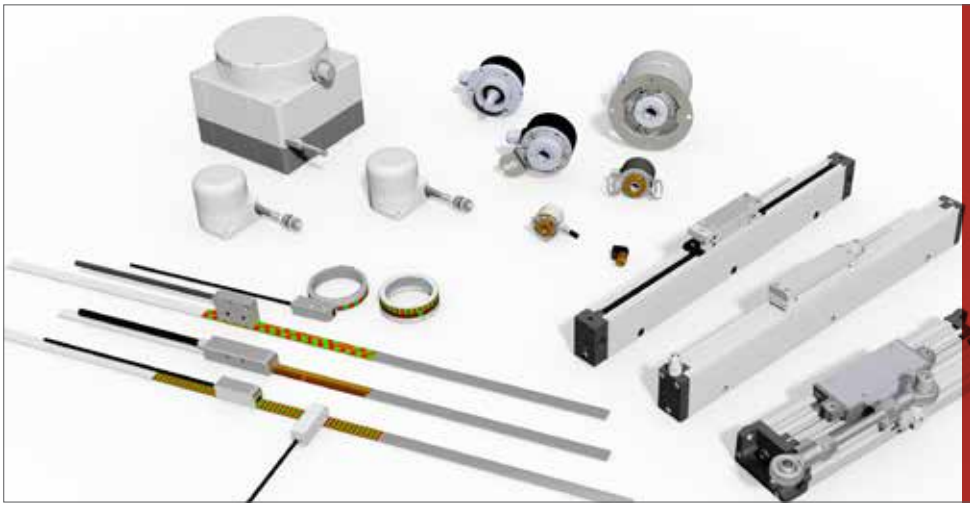
axial and radial run-out deviation



monitoring of fit accuracy

our product range

Messen

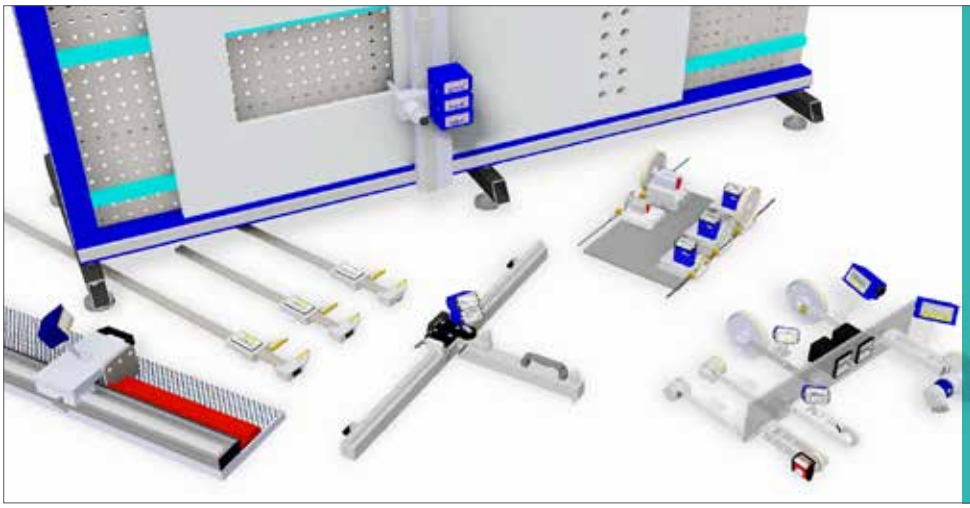


- magnetic position and angle measurement systems
- rotary encoders
- linear potentiometers
- optical scales
- inclination sensors
- distance sensors
- draw-wire encoders

Anzeigen

- spindle position indicators
- jog-wheel position indicators
- digital displays
- 3-axes displays
- touchscreen displays

Prüfen



- calipers
- meter counters
- tool presetters
- measuring stops
- measurement and test benches

inductive sensors

capacitive sensors

pressure sensors

ultrasonic sensors

optical sensors

magnetic sensors

Sensorik

angular gearboxes

screw jack systems

flexible shafts

articulated shafts

couplings

Mechanik

mountable housing

measurement wheels

angle flanges

connectors and wires

power supply units

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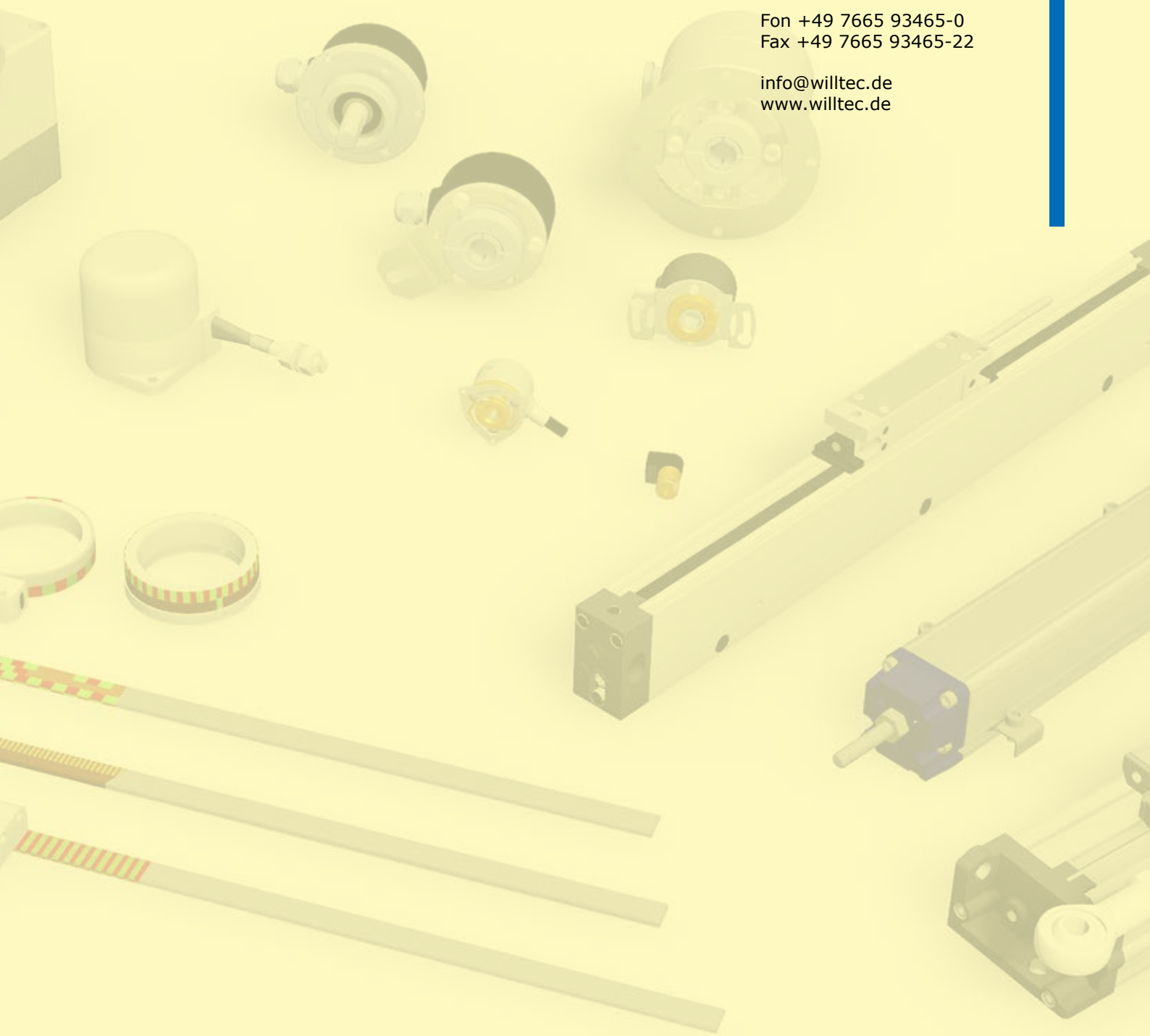

03-2017