

## Inductive Analog-Sensors

Item group 260



**Non-contacting measurement of distance and position**

- Distance
- Displacement
- Position
- Edge guiding
- Concentricity
- Centering
- Sorting
- Counting
- Expansion
- Deformation
- Deflection
- Vibration
- Excentricity
- Roll clearance
- Deviation

The inductive analog sensor is suitable for non-contacting measuring of distance or position referred to metals. The measuring principle is based on the physical effect of change of quality of a resonant circuit which is due to eddy current losses in conductive material.

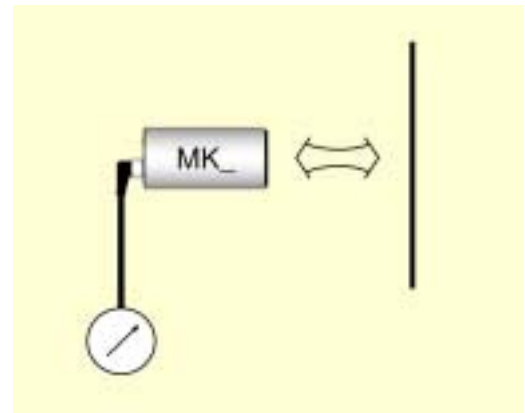
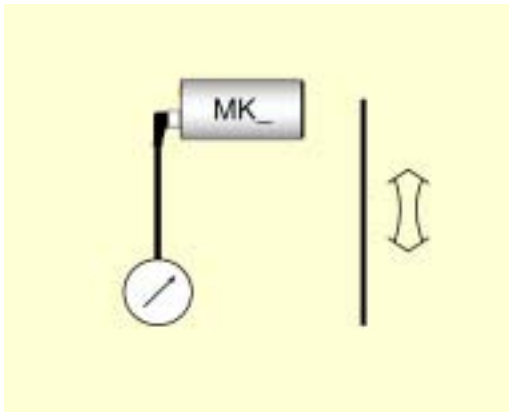
The high-frequency pulsating field of a LC resonant circuit leaves at the active surface of the sensor and is periodically excited by a pulse stage. As soon as electrically conductive material enters the field eddy currents result. Energy is taken from the resonant circuit, and its amplitude and decay time are influenced proportionally to the object distance. A  $\mu$ -processor serves for integration of the energy of the resonant circuit and determines the resulting output signal.

The electro-magnetic field is non-interacting, i. e. it does not produce any heating in the object to be measured nor does it have magnetic influence. Acc. to function measuring is carried out referring to moved or stationary metals. For fast processes it has to be considered that the periodically excited resonant circuit reaches a measuring rate between 100 and 250 per second.

The robust design in potted housing and easy handling make possible industrial standard solutions as well as sophisticated applications.

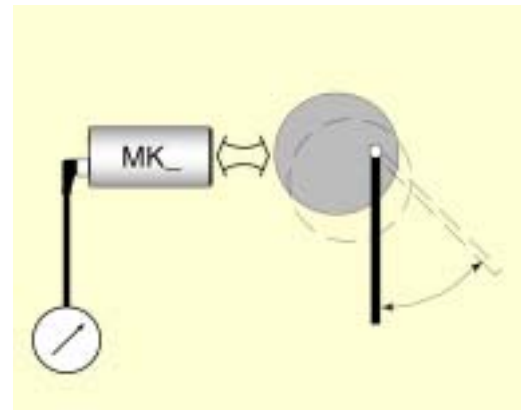
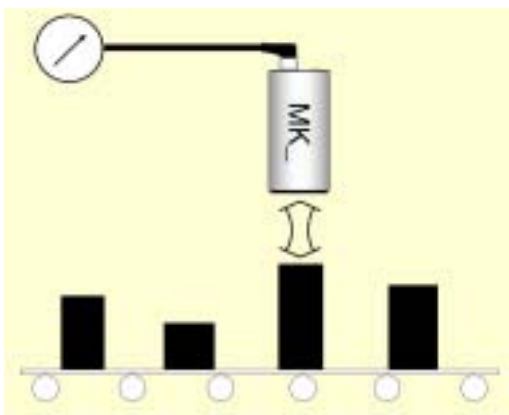
By means of two incorporated push-buttons measuring range and individual curve shapes can be programmed. Apart from the measuring value output a serial interface is available.

**Distance measuring in case of axial approach of the object to be measured**



**Displacement measuring in case of radial deviation of the object to be measured**

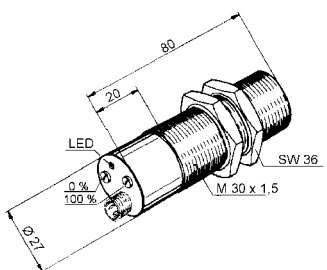
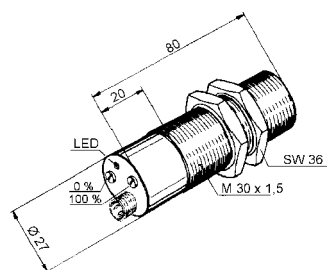
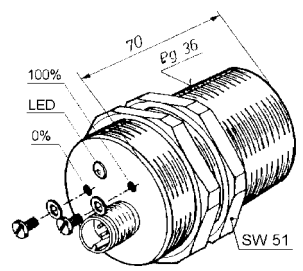
**Measuring of non-circularity or angle of rotation**

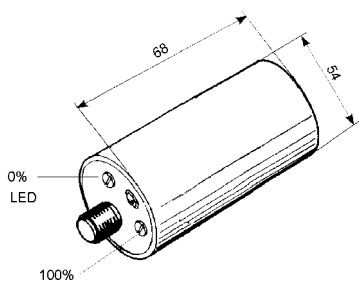
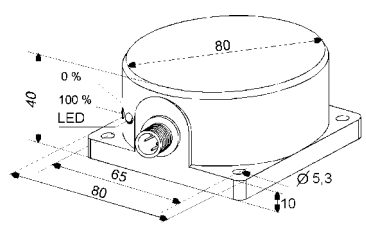
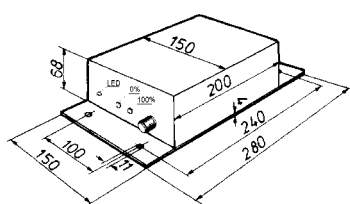


**Selection in the production area:  
 Height, surface or material properties**

# Type survey

Additional designs on request

Design:	M 30	M 30	PG 36
Distance range* (Ab):	0 – 10 mm	0 – 15 mm	0 – 20 mm
			
Installation:	flush	non-flush	flush
Response delay:	approx. 15 ms	approx. 15 ms	approx. 15 - 20 ms
Repeat accuracy:	≤ 0,3 %	≤ 0,3 %	≤ 0,3 %
Linearity deviation:	≤ 2,5 %	≤ 1 %	≤ 1 %
Temperature deviation:	≤ 5 %	≤ 5 %	≤ 5 %
Temperature deviation at 50 % Ab	≤ 2,5 %	≤ 1,5 %	≤ 1,5 %
Housing material:	plastic PBT	plastic PBT	brass, nickel-plated
<b>Type 0 – 10 V:</b>	<b>MKL 010.19 S4</b>	<b>MKL 015.19 S4</b>	<b>MKZ 471. 19 S4</b>
Art.-No.:	2482E	2482A	2330A
<b>Type 0 – 20 mA:</b>	<b>MKL 010.190 S4</b>	<b>MKL 015.190 S4</b>	<b>MKZ 471.190 S4</b>
Art.-No.:		2482B	2330B
<b>Type 4 – 20 mA:</b>	<b>MKL 010.194 S4</b>	<b>MKL 015.194 S4</b>	<b>MKZ 471.194 S4</b>
Art.-No.:	2482D	2482C	2330C
Notes:	including RS 485 interface	including RS 485 interface	including RS 485 interface

Design:	Ø 54 mm	Ø 80 mm	150 x 200 mm
Distance range* (Ab):	0 – 35 mm	0 – 50 mm	0 – 120 mm
			
Installation:	non-flush	non-flush	non-flush
Response delay:	approx. 15 - 20 ms	approx. 19 - 24 ms	approx. 19 - 24 ms
Repeat accuracy:	≤ 0,3 %	≤ 0,3 %	≤ 0,3 %
Linearity deviation:	≤ 1 %	≤ 2 %	≤ 2 %
Temperature deviation:	≤ 5 %	≤ 7 %	≤ 7 %
Temperature deviation at 50 % Ab	≤ 1,5 %	≤ 1,5 %	≤ 1,5 %
Housing material:	plastic PBT	plastic PBT	plastic PBT
<b>Type 0 – 10 V:</b>	<b>MKH 035.19 S4</b>	<b>MKK 050.19 S4</b>	<b>MKU 215.19 S4</b>
Art.-No.:	2338A	2331A	2159J
<b>Type 0 – 20 mA:</b>	<b>MKH 035.190 S4</b>	<b>MKK 050.190 S4</b>	<b>MKU 215.190 S4</b>
Art.-No.:	2338B	2331F	
<b>Type 4 – 20 mA:</b>	<b>MKH 035.194 S4</b>	<b>MKK 050.194 S4</b>	<b>MKU 215.194 S4</b>
Art.-No.:	2338C	2331G	2159L
Notes:	including RS 485 interface	including RS 485 interface	including RS 485 interface

\* The distance area refers to a square steel plate having an edge length of 3 times the max. distance value. Size deviations influence the working range. For other materials the correction factors stated on the next page have to be applied.

Compact analog sensors of series MK\_ monitor in a non-contacting manner distance, size or quantity of metallic objects. An integrated microprocessor serves for quick and simple adaption.

- Start and final value of the measuring range programmable.
- Limitation of the distance range utilizing the entire output range
- Reversal of efficiency direction
- Programmable linearization
- Adjustment of the sensor direct by two push-buttons at the application
- Settings as well as transmission of the distance value via serial interface
- Upto 30 analog sensors having a total cable length of upto 1000 m can be connected to one serial interface
- Different connection cable for simply utilising the analog output or for additional utilisation of the serial interface

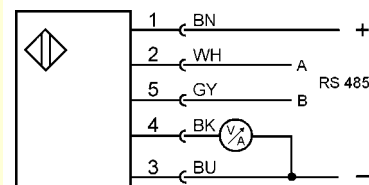
Please contact us for our application advice service.

We know many solutions.

### Technical Data

Distance range adjustable	yes
Load impedance at voltage output	≥ 10K
Load impedance at current output	≤ 560R
Ripple content	≤ 1 %
Output short-circuit protected	yes
Protected against polarity reversal	no
Digital communication	RS 485
Supply voltage	24 V DC ±20 %
Ripple voltage	max. 15 %
Current consumption	≤ 12 mA
Readiness delay	1 s from connection the supply voltage
Resolution	1 ‰ of final value
Ambient temperature	-10 ... +70 °C
Protection class	IP 67
Connection	plug S4 (M12 x 1)
Function display	LED

Diagram of connection



### Accessories (not included in scope of supply)

Description	Type	Art.-No.
3-pole angle connector with moulded connection cable of 5 m length for analog evaluation only	ST 041/3-5	9841R
alternatively for ST041/3-5: 5 pole angle connector with moulded connection cable of 5 m length for additional use of RS 485 interface	ST 041/5-5	9841Q

### Correction factors

Ab	Metal foil	Steel	Stainless steel	Brass	Aluminium	Copper
	x 1,20	x 1,0	x 0,85	x 0,5	x 0,45	x 0,40

### Survey of product group



Since 1979 Proxitron has been developing and manufacturing sensors. Sturdy construction and continuous quality control guarantee maximum reliability

[www.proxitron.de](http://www.proxitron.de)

#### Inductive proximity switch

- WG 210 Sensing distance < 20 mm
- WG 220 Sensing distance 20-60 mm
- WG 230 Sensing distance 60-120 mm
- WG 240 Sensor strips
- WG 241 Surface sensors
- WG 250 Ring-sensors
- WG 260 Inductive Analog-sensors and evaluation electronics

#### Other Sensors

- WG 100 Capacitive Sensors
- WG 510 Piros Light barriers
- WG 610 Piros Infrared-Sensors
- WG 620 Piros for fibre optics
- WG 630 Piros Infrared pyrometers
- WG 800 Flow-sensors for air
- WG 830 Flow-sensors

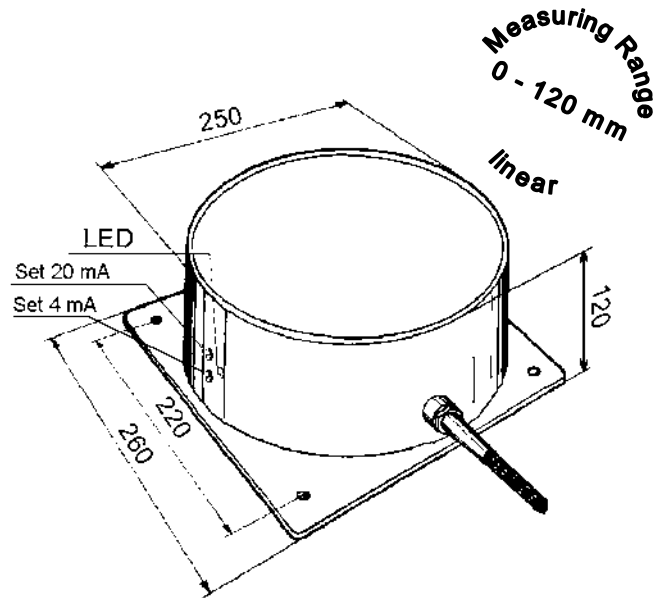
Compact analog sensor in stainless steel casing. The object distance can be transferred via the analogous output.

Range of distance and linearization for different applications can be individually set by two push-buttons.

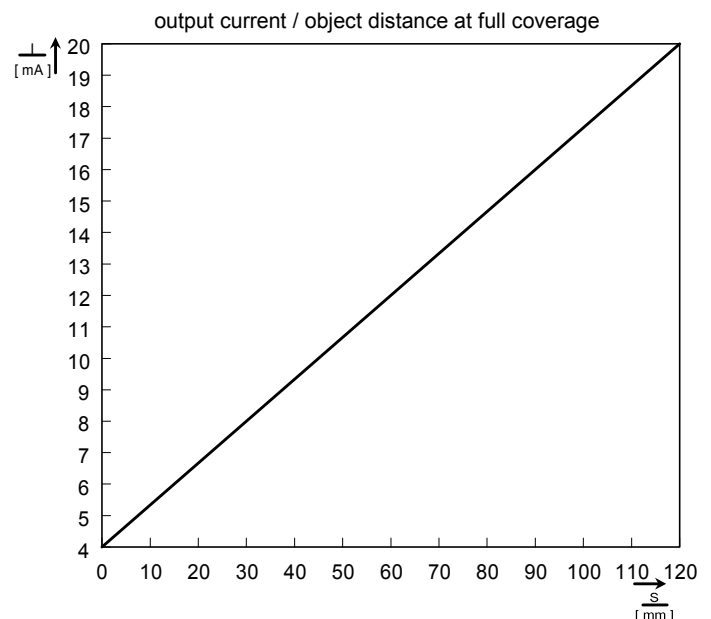
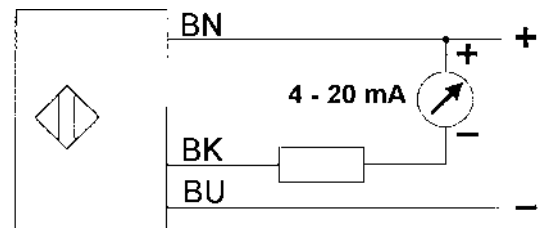
## Technical Data

<b>Type</b>	<b>MKZ 120.194</b>
Art.-No.	2159K
Distance range max. Ab	0 - 120 mm*
Distance range adjustable	yes
Output	4 – 20 mA
Load impedance max.	560R
Ripple content	≤ 1%
Output short circuit protected	yes
Reverse polarity protection	no
Location at metal	flush mount
Supply voltage	24 V DC ± 20%
Ripple voltage	max. 15 %
Current consumption	≤ 12 mA
Readiness time	1 s
Response delay	approx. 20 ms
Resolution	1 ‰ of final value
Repeatability	≤ 0,3 %
Error of linearity	≤ 3 %
Error of temperature	≤ 10 %
Ambient temperature	-10 ... +70 °C
Protection class	IP 65
Connection	2 m POKT Therm Cable
Function display	Duo-LED
Housing material	stainless steel 1.4301

\*Referred to measuring plate steel ST37, 1 mm thick 250 x 250 mm. Deviations of material and size of the object to be measured influence the range of operation.



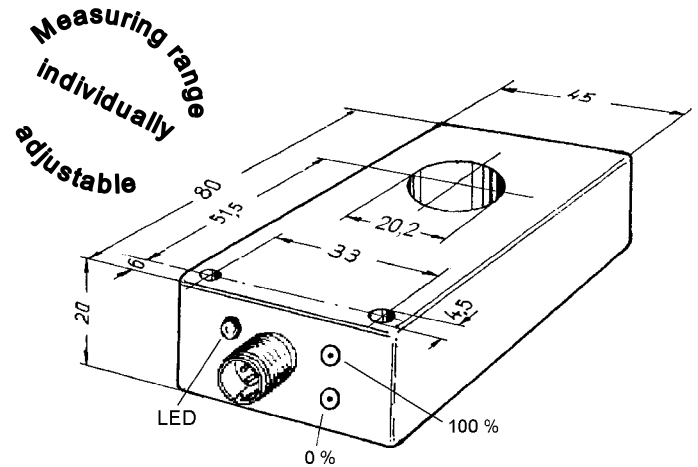
## Diagram of Connection



Compact analogue ring sensor with 20 mm opening.  
Different metal objects or depths of immersion produce the changes of measured value.

The measuring range and linearization are programmed with the keys on the device or via the RS485 interface that also transmits the measured value.

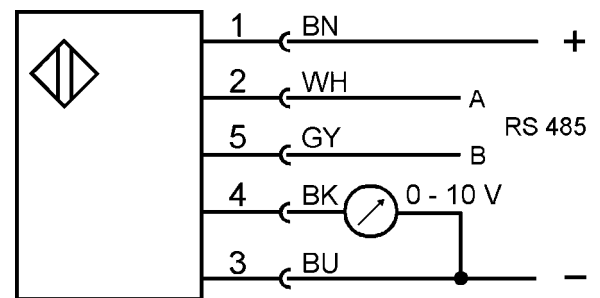
Areas of application are e.g. thickness measurement of varying screws, rods or wires, displacement measurement on machines by means of conical objects, or pattern recognition.



## Technical Data

Type	MKV 020.19 S4
Art.-No.	2489A
Distance range + linearization	adjustable
Output	0 – 10 V
Load impedance	$\geq 2 \text{ KOhm}$
Ripple content	$\leq 1\%$
Output short circuit protected	yes
Reverse polarity protection	yes (without RS 485)
Digital communication	RS 485
Location at metal	flush mount
Supply voltage	15 - 30 V DC
Ripple voltage	max. 15 %
Current consumption	$\leq 20 \text{ mA}$
Readiness time	1 s
Measuring rate frequency	50 Hz
Resolution	1 ‰ of final value
Repeatability	$\leq 0,3 \%$
Error of linearity	$\leq 2,5 \%$
Error of temperature	$\leq 5 \%$
Error of temperature at 50 % dist.	$\leq 2,5 \%$
Ambient temperature	-10 ... +70 °C
Protection class	IP 67
Connection	Plug S4 (M12x1)
Function display	Duo-LED
Housing material	plastic PBT
<b>Further available designs</b>	<b>Type:</b>
Output 0 – 20 mA	MKV 020.190 S4
Output 4 – 20 mA	MKV 020.194 S4
<b>Accessories</b>	<b>Art.-No.</b>
(not included in the scope of supply)	
suitable 3-polar angular coupling with moulded connection cable of 5 m length for analogous evaluation	9841R
5-polar angular coupling with moulded connection cable of 5 m length for additional use of RS 485 interface.	9841Q

## Diagram of Connection



Output signal related to dive in depth with conical metal part St 37  $\varnothing$  4 mm up to  $\varnothing$  18 mm with 60 mm of length.

