

**TomTom-Tools Ltd**  
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Switzerland

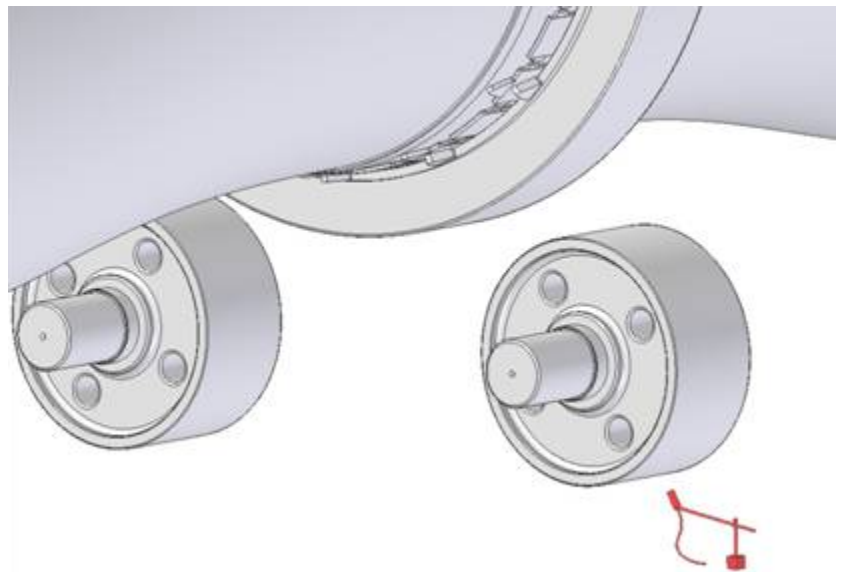
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Product Description:

## Inductive Distance Measurement

### Introduction:

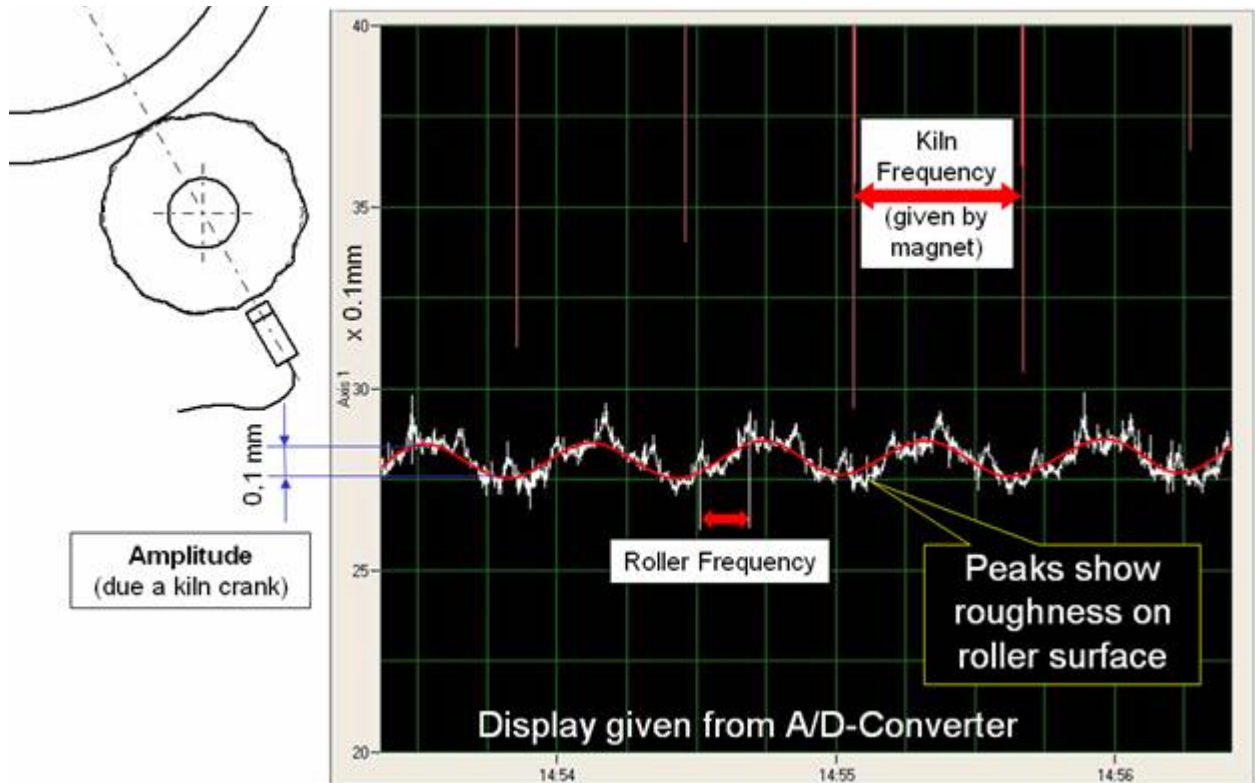
The inductive distance measurement tool is a device, which measures the distance or change of any distances contact less on any running equipment. It measures distances in vertical direction to any metal surface with a high accuracy, which replaces basically the traditional dial indicator and allows to measure on not cleaned surfaces during operation.



### Measuring Principle:

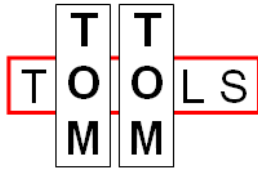
Inductive sensors use the physical effect of the change of quality of a resonance circuit, which is caused by eddy current losses in leading materials. A LC-resonant circuit produces a high frequency alternating field. This field withdraws at the active surface of the sensor. If an electrically conductive material arrives into the field, then eddy currents occur according the induction law which extract energy from the resonant circuit. The peak-to-peak swing becomes smaller. This change is converted into a switching signal. From the operational principle it follows that all metals are seized - independently of whether they move or not.

**Example:** Roller shaft bending on kiln roller due to kiln crank (thermal or mechanical)



**Components:**  
**Multi Box (4 chanel) National Instruments NI-DAQmx 9201:**

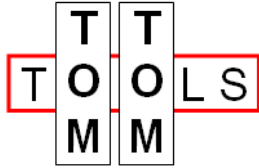




**Integrated Sensors (inductive sensor data sheet for ifm sensors):**

The measured distance will be transformed into a signal from 0 to 10 Volt with a slope (linear gradient) and a Y-intercept corresponding to the operating range.

Sensor	Ø12mm	Ø18mm	Ø30mm	40x40mm
Operating Range	0.4...4mm	0.8...8mm	1...15mm	1...25mm
Slope (linear gradient)	0.36 mm/V	0.72 mm/V	1.4 mm/V	2.4 mm/V
Y-Intercept	0.4	0.8	1	1
Minimal Target Size	12x12mm	24x24mm	45x45mm	90x90mm
Linearity Error	±3% of UA max	±1% of UA max	±% of UA max	±3% of UA max
Repeatability	±2% of UA max	±1% of UA max	±1% of UA max	±2% of UA max
Temp. Coefficient	±10% of UA max	±5% of UA max	±5% of UA max (-25...70°C) ±10% of UA max (70...80°C)	±10% of UA max (-25...70°C)
Response Time	< 10 ms	< 10 ms	< 20 ms	< 20 ms
Operating Temperature	-25...80°C			
Output	0...10VDC (analog)			
Operating Voltage	15...30VDC			
Current Consumption	< 20 mA			
Short-circuit protection	yes			
Protection	IP 67			
Correction Factors	Mild Steel = 1 Stainless Steel = approx. 0.5 Aluminum = approx. 0.4 Copper = approx. 0.3			
Display	Within operating range: yellow (permanently lit) Outside the operating range: yellow (flashing)			
Mounting:	Non-flush mountable			
Wiring				



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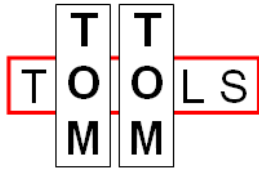
### **Advantages**

- Measurement during operation
- Cleaning not required
- High accuracy (< 0.3mm/m)
- High sampling rate (up to 1kHz)
- Measures contact less, installation can be done on running equipment in a safe way
- Results electronically available for further analysis
- Hardware compatible to advanced software for Fourier transformation or other calculations
- Connection of any sensor with  $\pm 0 - 10$  Volt output and/or power supply of 24 Volts (such as laser sensors or strain gages)

### **Disadvantages**

- Affected by high temperature (max.80°C inside sensor)
- Work area only up to 15 mm close to the surface
- Laptop required



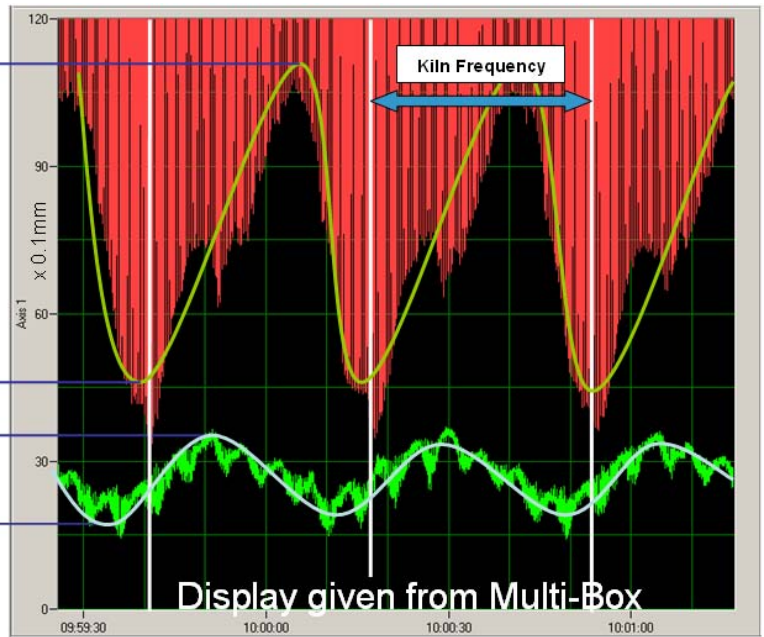


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**Application (Example):**

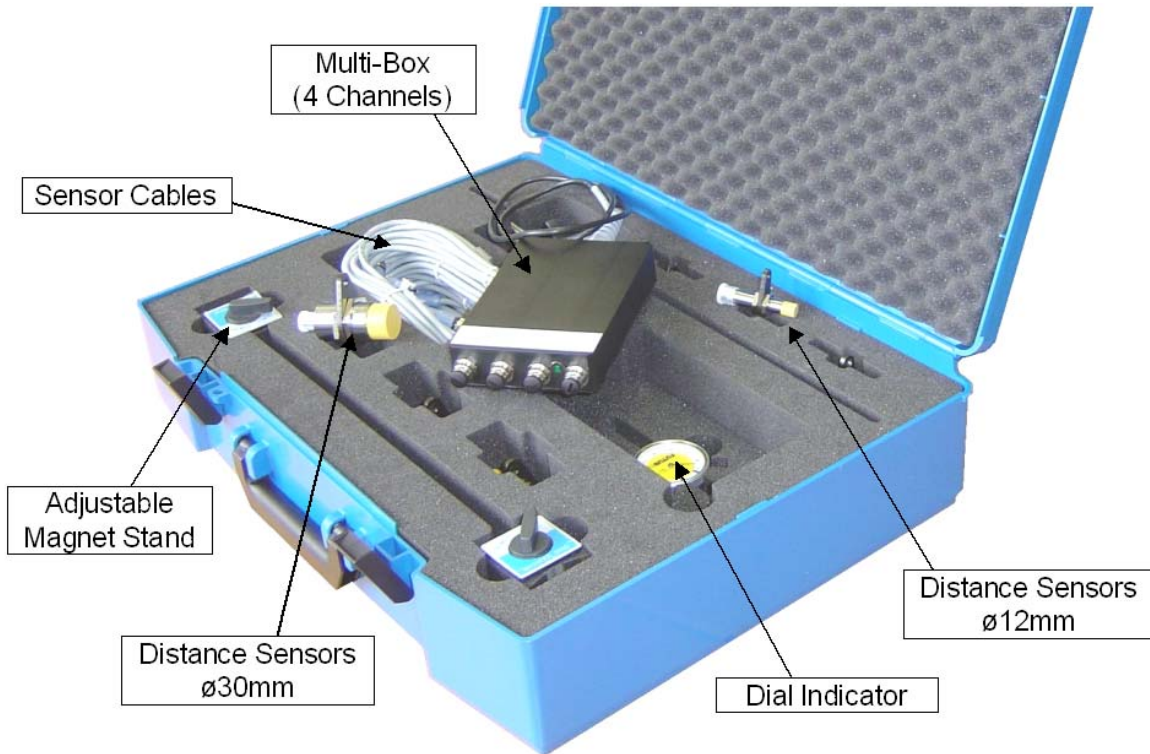
- Run out on girth gear



- Roller shaft bending



**Measurement Kit:**



**Caution**

Please be aware that the diameter of the sensor can not be bigger than the measured face. The distance value will not be correct.

