# Strain transducer up to 1,000 µe Model F9302



WIKA Data sheet FO 54.10

## **Applications**

- Injection molding machines
- Presses, stamping and embossing machines
- Structural steelwork, vessel supports
- Special vehicles
- Construction machines

## **Special features**

- Integrated amplifier
- Good long-term stability, high shock and vibration immunity
- Good reproducibility
- As retrofitting, easy to install
- For use in extreme outdoor applications (IP67, optional IP69K)



Strain transducer, model F9302

## **Description**

The strain transducer has been designed for applications in which there is a need to measure the deformation due to external forces acting on an existing component. The device is simply screwed onto the component. After calibration the unit obtains the characteristics of a force transducer. The strain transducer is suitable for use on structures where elongation is in the range max.  $\leq 1.0$  %. Two screws are used to attach it to a region of the structure at which the relevant elongation occurs. A amplifier is integrated. The combined deformation body/strain transducer is easy to calibrate via control signals. The overall accuracy achieved depends on

the installation situation, but is better than 2 % of F.S..

At the heart of the strain transducer is a 7 mm thin-film sensor with a temperature-compensated Wheatstone bridge circuit fitted into the tightest of spaces. The digital programmable amplifier permits factory presetting to specific application requirements. The transducer may be used both for static and for dynamic measurement.

The strain transducers fulfil the electromagnetic compatibility (EMC) requirements of EN 61326.

#### Measuring range

Strain from 0 ... 200  $\mu e$ , up to max. 0 ... 1,000  $\mu e$ 



## Mode of operation

When a load is applied to a mechanical structure, the latter's shape alters to some degree. If a strain tranducer is attached to a suitable place on a component, it will suffer the same deformation as the component. The tensile and compressive stresses are detected and amplified.

Once the transducer has been attached to the component using the two captive M6 screws, the unit so formed then has

to be calibrated. In the unloaded state, the zero point is set with the "zero" control line by submitting a bit sequence via a plc.

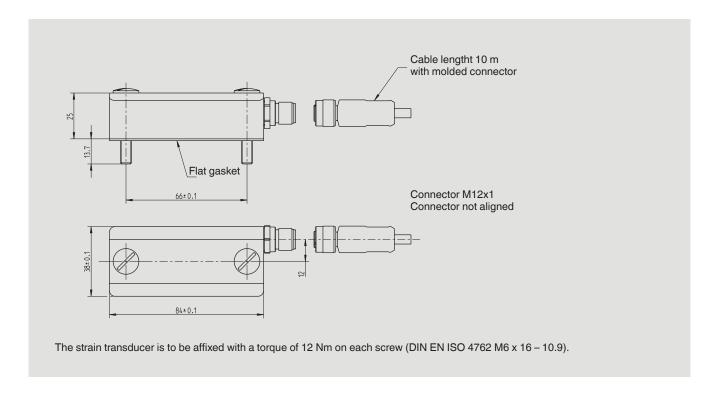
Matching of the temperature coefficient (TC) of the output signal to the applied component, as well as adjustment of the limit frequency, is possible through factory pre-programming.

### Technical data in accordance with VDI/VDE/DKD 2638

Relative linearity error d <sub>lin</sub> ≤ 1% of F.S.*  Relative repeatability error in:  ■ unchanged mounting position b <sub>rg</sub> 0.5 % of F.S.  Nominal temperature B <sub>T, nom</sub> Coperating temperature B <sub>T, G</sub> Operating temperature B <sub>T, G</sub> Coperating temperature ange B <sub>T, S</sub> Coperating temperature B <sub>T, Nom</sub> Coperating temperature ange B <sub>T, S</sub> Coperating temperature ange B <sub>T, </sub>	Model F9302	
Relative repeatability error in:  unchanged mounting position b <sub>rg</sub> unchanged mounting position b <sub>rg</sub> objecting temperature B <sub>T, nom</sub> Operating temperature B <sub>T, nom</sub> Operating temperature B <sub>T, G</sub> **Output Signal TKo  **Disse immunity  **In accordance with DIN EN 61326-1/DIN EN 61326-2-3  **Electrical protection  **Weight in g Oberflächenbeschaffenheit Schraubenanzugsmoment M6 Analogue output  **Output signal (characteristic value) C  **Supply voltage Current consumption  **Burden  **Jo. 5 Mo F.S.  **Output Signal Color  **Output signal (characteristic value) C  **Au. +88 °C  **Common permanently laid cable -25 +80 °C, permanently laid cable -25 +80 °C  **Au. +85 °C  **Temperature effect on  Typ. ±0.3 % of F.S./10 K *  Typ. ±0.3 % of F.S./10 K *  **Typ. ±0.1 % of F.S.	Measuring range B	0 ±200 μe, 0 ±500 μe, ±1,000 μe
unchanged mounting position b <sub>rg</sub>   different mounting positions b <sub>rv</sub>   0.5 % of F.S.     Nominal temperature B <sub>T, nom</sub>   -20 +80 °C     Operating temperature B <sub>T, G</sub>   -40 +80 °C, permanently laid cable   -25 +80 °C, moving cable    -25	Relative linearity error d <sub>lin</sub>	≤ 1% of F.S. *
Operating temperature B <sub>T, G</sub> -40 +80 °C, permanently laid cable -25 +80 °C, moving cable  Storage temperature range B <sub>T, S</sub> -40 +85 °C  Temperature effect on    characteristic value TKc	Relative repeatability error in:  ■ unchanged mounting position b <sub>rg</sub> ■ different mounting positions b <sub>rv</sub>	0.5 % of F.S.
Storage temperature range B <sub>T, S</sub> -40 +85 °C  Temperature effect on  characteristic value TKc  typ. ±0.3 % of F.S./10 K *  Typ. ±0.1 % of F.S./10 K *  Typ. ±0.3 % of F.S./10 K *  Typ. ±0.1 %	Nominal temperature B <sub>T, nom</sub>	-20 +80 °C
Temperature effect on characteristic value TKc zero signal TKo Typ. ±0.3 % of F.S./10 K * Typ. ±0.1 % of F.S./10 K * Typ. ±0.1 % of F.S./10 K * Typ. ±0.1 % of F.S./10 K *  Vibration resistance 20 g, 100 h, 50150 Hz in accordance with DIN EN 60068-2-6  Protection type IP67 (optional IP69K) in accordance with EN/IEC 60529  Noise emission In accordance with DIN EN 55011 In accordance with DIN EN 61326-1/DIN EN 61326-2-3  Electrical protection Reverse voltage, overvoltage and short circuit protection  Weight in g 200 Deberflächenbeschaffenheit Minimum requirement: evenness 0.05 mm/surface roughness Ra=16  Schraubenanzugsmoment M6 12 Nm  Analogue output Output signal (characteristic value) C Supply voltage DC 10 30 V Current consumption Max. 25 mA  Burden Limit frequency  < 2 kHz (-3 dB)	Operating temperature B <sub>T, G</sub>	
tharacteristic value TKc	Storage temperature range B <sub>T, S</sub>	-40 +85 °C
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Noise emission       In accordance with DIN EN 55011         Noise immunity       In accordance with DIN EN 61326-1/DIN EN 61326-2-3         Electrical protection       Reverse voltage, overvoltage and short circuit protection         Weight in g       200         Oberflächenbeschaffenheit       Minimum requirement: evenness 0.05 mm/surface roughness Ra=16         Schraubenanzugsmoment M6       12 Nm         Analogue output       4 20 mA         Output signal (characteristic value) C       4 20 mA         Supply voltage       DC 10 30 V         Current consumption       Max. 25 mA         Burden       > 10 kΩ         Limit frequency       < 2 kHz (-3 dB)	Vibration resistance	20 g, 100 h, 50150 Hz in accordance with DIN EN 60068-2-6
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Current consumption  Max. 25 mA  Burden  > 10 kΩ  Limit frequency  < 2 kHz (-3 dB)	Analogue output ■ Output signal (characteristic value) C	4 20 mA
Burden $> 10 \text{ k}\Omega$ Limit frequency $< 2 \text{ kHz (-3 dB)}$	■ Supply voltage	DC 10 30 V
Limit frequency < 2 kHz (-3 dB)	■ Current consumption	Max. 25 mA
	■ Burden	> 10 kΩ
Flactrical connection Circular connection M12 v 1 /-nin	■ Limit frequency	< 2 kHz (-3 dB)
= Liection connection, witz x 1, 4-pin	■ Electrical connection	Circular connection, M12 x 1, 4-pin

 $<sup>^{\</sup>star}$  Dependent on surface material, Measuring element of 1.4542 stainless steel of F.S. = of Full Scale

## **Dimensions in mm**



## **Electrical connection**

Electrical connection	4 20 mA (3-wire)
Output	
Supply: (UB+)	Brown
Supply: (UB-)	Blue
Signal: (+)	White
Signal: (-)	-
Inputs	
Control line "Tara" (Com 1)	Black

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WIKA Data sheet FO 54.10 · 06/2016

Page 3 of 3



63911 Klingenberg/Germany Tel. +49 9372 132-0 Fax +49 9372 132-406

info@wika.de www.wika.de