

Strain transducer

0...200 $\mu\epsilon$ up to 0...1.000 $\mu\epsilon$

Model F9302

Applications

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

Special features

- Strains from 0...200 $\mu\epsilon$ up to max. 0...1.000 $\mu\epsilon$
- Integrated amplifier
- Good long-term stability, high shock and vibration resistance
- Good reproducibility
- As retrofitting, easy to install
- For use in extreme outdoor applications (IP67, optional IP69K)
- Relative linearity error < 2 % F_{nom}

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. An amplifier is integrated. The combined



deformation body/strain transducer is easy to adjust via control signals.

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.

Specifications in accordance with VDI/VDE/DKD 2638

Model series	Symbol	Unit	F9302
Measurement range			
Strain		$\mu\epsilon$	0...±200, 0...±500, 0...±1.000 $\mu\epsilon$
Accuracy and stability			
Relative linearity error	d_{lin}	$x\%F_{nom}$	≤± 2
Relative repeatability error in			
■ unchanged mounting position	b_{rg}	$x\%F_{nom}$	0.5
■ different mounting positions	b_{rv}	$x\%F_{nom}$	0.5
Temperature effect on zero signal	TK_0	$\%/10\text{ K}$	0.1
Temperature effect on characteristic value	TK_C	$\%/10\text{ K}$	0.3
Temperature ranges			
Rated temperature range	$B_{T, nom}$	$^{\circ}\text{C}$	-20...80
Operating temperature range	$B_{T, G}$	$^{\circ}\text{C}$	-40...80 permanently laid cable -25...80 moving cable
Storage temperature range	$B_{T, S}$	$^{\circ}\text{C}$	-40...85
Electrical characteristics			
Output signal (rated output)	C_{nom}	mA	4...20, 3-wire
Current consumption		mA	Max. 25
Supply voltage		V	DC 10...30
Burden		kΩ	> 10
Limit frequency		kHz	< 2 (-3 dB)
General data			
Protection (acc. to EN/IEC 60529)			IP67 (optional IP69k)
Vibration resistance (acc. to DIN EN 60068-2-6)			20 g, 100 h, 50...150 Hz
Electrical protection			Reverse voltage, overvoltage and short-circuit protection
Emission			DIN EN 55011
Immunity			DIN EN 61326-1/DIN EN 61326-2-3
Electrical connection			Circular connection, M12 x 1, 4-pin
Surface finish			Minimum requirement: evenness 0.05 mm/surface roughness Ra=16
M6 screw tightening torque		Nm	12
Weight		g	200

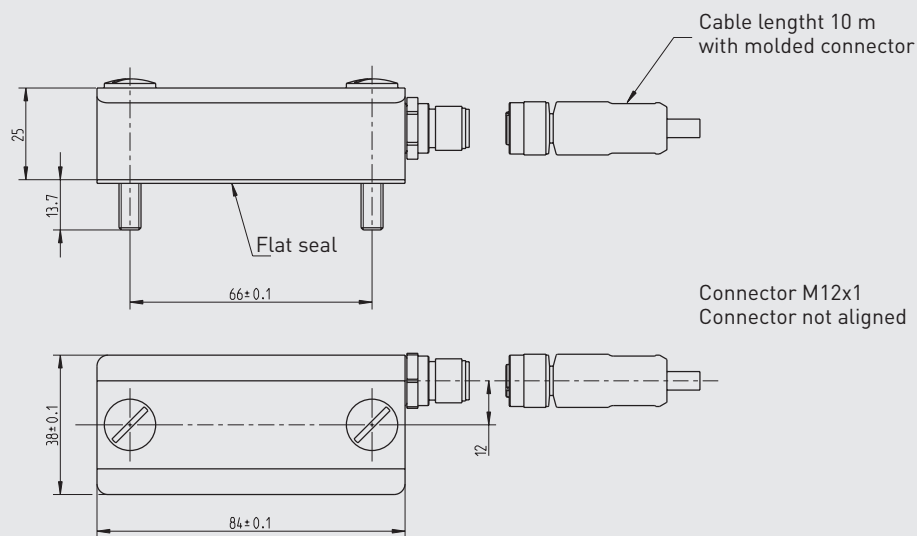
Mode of operation

When a load is applied to a mechanical structure, the latter's shape alters to some degree. If a strain transducer is attached to a suitable place on a component, it will suffer the same deformations as the component. The tension and compression 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.

Dimensions in mm



The strain transducer is to be affixed with a torque of 12 Nm on each screw (DIN EN ISO 4762 M6 x 16 – 10.9).

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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