Strain Transducer with thin-film sensor for general applications

Strain: **max. 1000 με**

Output signals: **0...10 VDC; 4-wires**

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 0.1‰ ≤ ε ≤ 1.0‰. Two screws are used to attach it to a region of the structure at which the relevant elongation occurs. A 0…10V amplifier is integrated. The combined deformation body/strain transducer is easy to calibrate via control signals. Measuring range selection is optionally available and can be triggered via a further control line.
The overall accuracy achieved depends on the installation situation, but is better than 2% of FS.

At the heart of the strain transducer is a 7mm 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.

Features

- Thin-film implant
- Integrated amplifier
- Measuring range selection (optional)
- Good long-term stability
- High shock and vibration immunity
- Suitable for dynamic or static measurements
- Good reproducibility
- As retrofitting, easy to install
- Simple calibration

Measuring range

- Strain up to a max. of 1000 μ ε

Areas of use

- Injection molding machines
- Presses
- Stamping machines
- Embossing machines
- Structural steelwork
- Special vehicles
- Construction machines
- Vessel supports

Model: F9302

Mode of operation

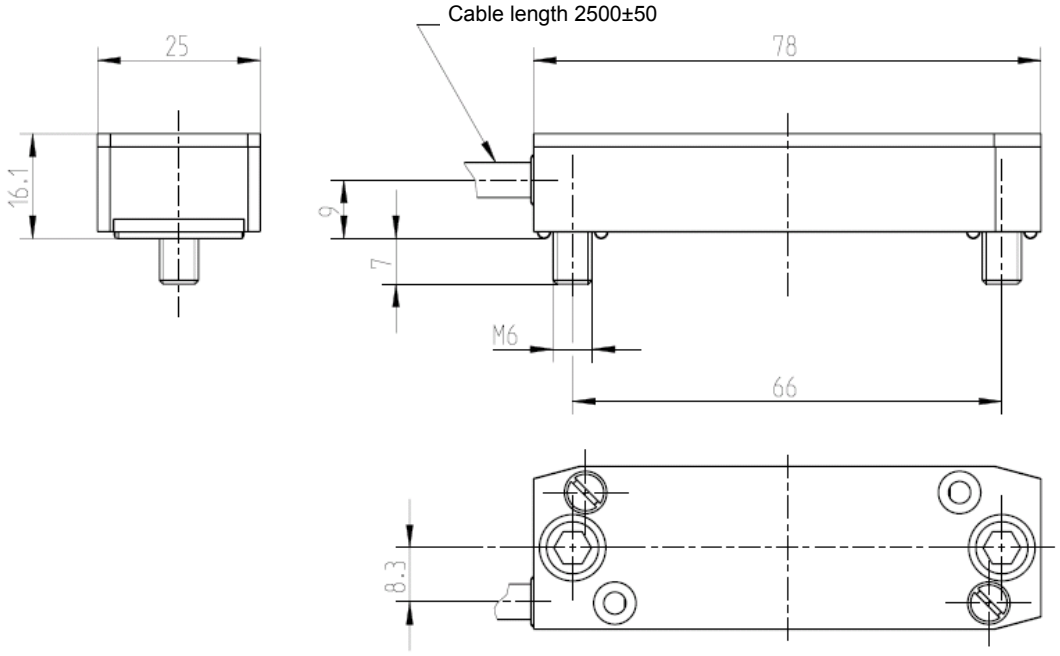
When a load is applied to a mechanical structure, the latter's shape alters to some degree. If a strain tranducer is attached to a suitable place on a component, it will suffer the same deformation as the component. The tensile and compressive stresses are detected and amplified.
Once the transducer has been attached to the component using the two captive M6 screws, the unit so formed then has to be calibrated. Two control signals are used for this purpose. In the unloaded state, the zero point is set via the "zero" control line. The span (sensitivity) of the overall system is adjusted via the "span" control line. For this, it has to be subjected to a defined load. As an option a second measuring range can be adjusted. Via a third control line the ranges can be switched.
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 specifications

Model	**F9302X000003**	**F9302X000002**
Measuring range - minimum - maximum	0 … 100 µε (pos. or neg. elongation) 0 … 1000 µε	
Capture range - zero point - sensitivity	± 2000 µε ± 3000 µε	
Measuring range selection	no	Freely adjustable (max. 1:10)
Combined error	≤ 2% of FS *	
Reproducibility - in same installation - after refitting	 0.5 % of FS 0,5 % of FS	
Nominal temperature range	-20°C … +80°C	
Working temperature range	-30°C … +80°C, fixed cable -5°C … +70°C, moving cable	
Storage temperature range	-40°C … +85°C	
Temperature influence - zero signal - characteristic	Typ. ±0.5% of FS /10K * Typ. ±0.2% of FS /10K *	
Vibration immunity	20g, 100h, 50...150 Hz acc. to DIN EN 60068-2-6	
Protection type (accord. to EN 60 529 / IEC 529)	IP 67	
Emitted interference	Acc. to EN 61326	
Interference immunity	Acc. to EN 61326	
Types of electrical protection	Reversed polarity, overvoltage and short-circuit protection	
Weight	200 g	
Surface finish	Minimum requirement: evenness 0.05 mm / surface roughness Ra=16	
M6 screw tightening torque	12 Nm	
Analogue output - Output signal - Auxiliary power - Current consumption - Burden - Limit frequency - Meas. range 1 - Meas. range 2 - Electrical connection	 0 … 10 V; 4-wire system 13 … 30 V DC for voltage output Max. 25 mA > 10 kΩ for voltage output < 2 kHz (-3 dB), factory pre-programmable Cable, 8-wires shielded PVC, length 2 metres	
Inputs		
Control line "Zero" (Reset)	High active (>5V)	
Reset time	< 25 ms (>2 s: adoption of zero point as standard value)	
Control line: "Span" (Adjust)	High active (>5V)	
Adjust time	< 60 ms	
Control line: "Measuring Range"		Level > 5 V: Meas. range 2, Level < 3 V: Meas. range 1
Selection time for measuring range		< 30 ms

* Dependent on surface material Remark: Measuring element of 1.4542 stainless steel

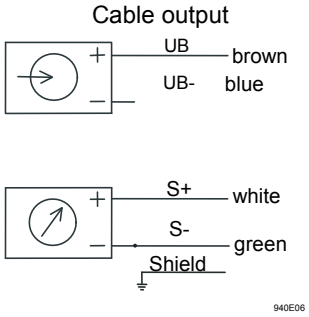
Dimensioned drawing (in mm)



The strain transducer is to be affixed with a torque of 12 Nm on each screw.

Electrical connection

Output 0...10V (3-wire system)



Pin assignment

Electrical connection	**0...10 V DC (3 wire)** Connection ID acc. to DIN 47100
Output	
Supply: (UB+)	white
Supply: (UB-)	green
Signal: (+)	yellow
Signal: (-)	brown
Inputs	
Control line “Zero“ (Com 1)	pink
Control line “Span“ (Com 2)	grey
Optional: control line “measuring range selection” (Com 3)	blue
GND	