

Low Level Force Sensor

Type 9217A

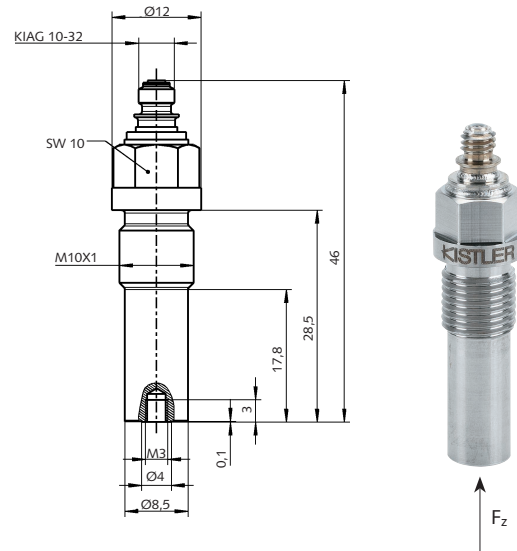
M10x1, -500 ... 500 N

Highly sensitive, piezoelectric force sensor for measuring quasi-static and dynamic tensile and compression forces from a few mN upwards. The sensor has a sealed case and is suitable for both laboratory and industrial applications.

- 2 calibrated measuring ranges
- Dynamic measuring range 1 : 100 000
- Highly sensitive, for forces from 1 mN upwards
- For tensile and compression forces
- High allowable bending moment
- High rigidity

Description

The preloaded, highly sensitive measuring element gives the sensor very high rigidity and a high tolerance to bending moments. The sensor body has an M10x1 external thread and a sealed, ceramic-insulated connector. The force is introduced via the M3 tapped hole at the front.



Technical Data

| | | | |
|---------------------------------------|---------------------------|------------|-------------------------|
| Measuring range | F_z | N | -500 ... 500 |
| Overload | F_z | N | -600/600 |
| Calibrated measuring ranges | | | |
| 100 % | F_z | N | 0 ... 500 0 ... -500 |
| 10 % | F_z | N | 0 ... 50 0 ... -50 |
| Threshold | | N | <0,001 |
| Sensitivity | F_z | pC/N | ≈ -105 |
| Linearity, typical | | %FSO | <0,2 |
| Hysteresis, typical | | %FSO | <0,2 |
| Transverse force ¹⁾ , max. | $F_{x,y}$ | N | 50 |
| Transverse force sensitivity | $F_{x,y} \rightarrow F_z$ | N/N | $\leq \pm 0,02$ |
| Transverse force sensitivity, typical | | N/N | $\leq \pm 0,01$ |
| Bending moment, max. | $M_{x,y}$ | N·m | 1,78 |
| Torque, max. | M_z | N·m | 1,35 |
| Rigidity | c_z | N/ μ m | ≈ 15 |

¹⁾ Point of force application at tip of force introducing cap

| | | |
|---|----------|-----------------|
| Natural frequency | kHz | >20 |
| Acceleration sensitivity | | |
| axial | N/g | <0,035 |
| radial | N/g | <0,003 |
| Operating temperature range | °C | -50 ... 150 |
| Temperature coefficient of sensitivity | | |
| 20 ... 100 °C | %/°C | <0,04 |
| 100 ... 150 °C | %/°C | <0,04 |
| Insulation resistance at 20 °C | Ω | $>10^{13}$ |
| Capacitance | pF | ≈ 45 |
| Connector (ceramic insulator) | | KIAG 10-32 neg. |
| Degree of protection (with cable connected) | EN60529 | IP65 |
| Case material | DIN | 1.4542 |
| Weight | g | 16 |
| Tightening torque, max. | | |
| M10x1 | N·m | 10 |
| M3 | N·m | 0,5 |

Application

Broad field of application for monitoring assembly processes, in product testing and for highly sensitive force measurements in research and development.

Examples of Application

- Contact force measurement on keys, switches, relays etc.
- Measurement of spring characteristics
- Measurement of extraction forces at electrical connector contacts
- Construction of highly sensitive miniature force plates, e.g. for measurements in a wind tunnel
- Force measurements on automatic assembly machines, such as robots, micromanipulators etc.

Optional Accessories

- | | | |
|--|----------------------|-----------|
| • Force introducing cap | Type/Art. No. | 3.220.139 |
| • Coupling element | | 9405 |
| • Fork wrench SW 5,5 | | 5.210.096 |
| • Elbow coupling KIAG 10-32 pos. int. – KIAG 10-32 neg. int. | | 1700A29 |
| • Connecting cable KIAG 10-32 pos. int. – BNC pos. | | 1939A... |
| • Connecting cable KIAG 10-32 pos. – BNC pos. | | |
| Length 1 m | | 1631C1 |
| Length 2 m | | 1631C2 |
| Length 5 m | | 1631C5 |
| Length 10 m | | 1631C10 |
- (see data sheet cables for force, torque and strain sensors 1631C_000-346)

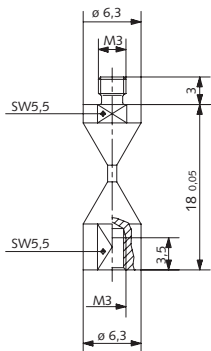


Fig. 1: Coupling element Type 9405

Installation

Installation by means of the M10x1 thread with force introduced via the M3 thread (Fig. 2). The force introducing cap (Fig. 3) is used for punctiform introduction of force.

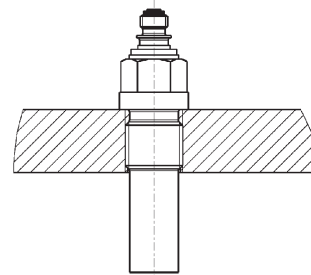


Fig. 2: Mounting with M10x1 thread

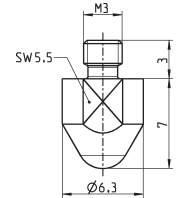


Fig. 3: Force introducing cap Art. No. 3.220.139

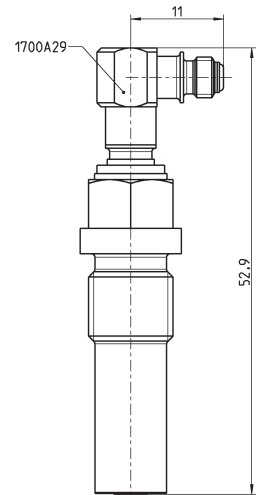
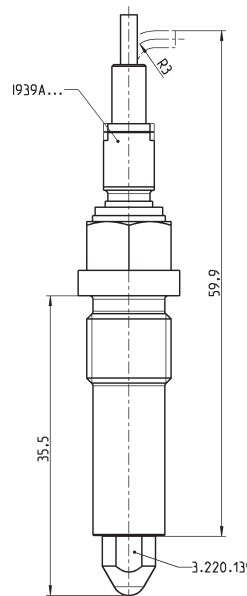


Fig. 4: Low level force sensor Type 9217A with connecting cable Type 1939A... and force introducing cap Art. No. 3.220.139 (left) as well as with elbow coupling Type 1700A29 (right)

Ordering Code

- Low Level Force Sensor M10x1, –500 ... 500 N

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