Force

Low Level Force Sensor for Tensile and Compression Forces

–50 ... 50 N to −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

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Fz N</th>
<th>−500 ... 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload</td>
<td>Fz N</td>
<td>−600/600</td>
</tr>
</tbody>
</table>

Calibrated measuring ranges

<table>
<thead>
<tr>
<th>%</th>
<th>Fz N</th>
<th>0 ... 500</th>
<th>0 ... −500</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 %</td>
<td>Fz N</td>
<td>0 ... 500</td>
<td>0 ... −500</td>
</tr>
<tr>
<td>10 %</td>
<td>Fz N</td>
<td>0 ... 50</td>
<td>0 ... −50</td>
</tr>
<tr>
<td>1 %</td>
<td>Fz N</td>
<td>0 ... 5</td>
<td></td>
</tr>
</tbody>
</table>

Threshold | N | <0,001 |

Sensitivity | Fz pC/N | ≈−105 |

Linearity, typical | %FSO | <0,2 |

Hysteresis, typical | %FSO | <0,2 |

Transverse force | Fxy N | 50 |

Transverse force sensitivity | Fxy Fz N/N | ≤0,02 |

Torque sensitivity | Fxy Fz N/N | ≤0,01 |

Torque, max. | Mxy N/m | 1,78 |

Rigidity | c2 N/μm | ≤15 |

Natural frequency | kHz | >20 |

Acceleration sensitivity
- axial | N/g | <0,035 |
- radial | N/g | <0,003 |

Operating temperature range | °C | −80 ... 205 |

Temperature coefficient of sensitivity
- 20 ... 100 °C | %/°C | <0,04 |
- 100 ... 150 °C | %/°C | <0,04 |

Insulation resistance at 20 °C | Ω | >10¹³ |

Capacitance | pF | 45 |

Connector (ceramic insulator) | KIAG 10-32 neg. |

Degree of protection (with cable connected) | EN60529 IP65 |

Case material | DIN 1.4542 | 1.4542 |

Weight | g | 16 |

Tightening torque, max.
- M10x1 | N·m | 10 |
- M3 | N·m | 0,5 |

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

This information corresponds to the current state of knowledge. Kistler reserves the right to make technical changes. Liability for consequential damage resulting from the use of Kistler products is excluded.

©2005 ... 2010, Kistler Group, Eulachstrasse 22, 8408 Winterthur, Switzerland
Tel. +41 52 224 11 11, Fax +41 52 224 14 14, info@kistler.com, www.kistler.com
Kistler is a registered trademark of Kistler Holding AG.
Low Level Force Sensor – for Tensile and Compression Force, –50 ... 50 N to –500 ... 500 N, Type 9217A

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
• Coupling element
• Fork wrench SW 5,5
• Elbow coupling KIAG 10-32 pos. int. – KIAG 10-32 neg. int.
• Connecting cable KIAG 10-32 pos. int. – BNC pos.
• Connecting cable KIAG 10-32 pos. – BNC pos.
  Length 1 m
  Length 2 m
  Length 5 m
  Length 10 m
(see data sheet cables for force, torque and strain sensors 1631C_000-346)

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. 1: Coupling element Type 9405

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 Key
• Low Level Force Sensor for tensile and compression forces –50 ... 50 N to –500 ... 500 N

Type
9217A

Type/Art. No.
3.220.139
9405
5.210.096
1700A29
1939A...
1631C1
1631C2
1631C5
1631C10

This information corresponds to the current state of knowledge. Kistler reserves the right to make technical changes. Liability for consequential damage resulting from the use of Kistler products is excluded.