

HighSens force sensor SlimLine

Type 9132CD

Piezoelectric ring force transducer for very small tensile and compression forces up to 2.7 kN

Highly sensitive crystal-based force sensor with integrated drag-chain suitable connecting cable to measure very small highly dynamic and quasistatic forces (F_z). The sensors have a sealed housing and are ideal for industrial and laboratory applications.

The force sensor is shipped calibrated. For absolute measurements in installed, preloaded condition, recalibration is recommended.

- Extremely high sensitivity
- Extremely small, lightweight design with wide measuring range
- When preloaded, also suitable for tensile forces
- One calibrated measuring range
- Measures practically free of displacement, wear and fatigue
- Can measure even the smallest forces with high resolution
- Sealed housing (IP65)
- Available with KIAG 10-32 pos. connector plug with swivel nut or BNC pos.

Description

The force F to be measured acts on the sensor via the preloading/installation structure and generates a charge directly proportional to the force. This is picked off by an electrode and fed to the charge amplifier via the integrated cable.

Application

This member of our tried-and-tested SlimLine sensor family for measuring very small forces is based on the use of the piezo crystal material KI80. These measuring elements offer a uniquely high sensitivity. Because SlimLine sensors are very stiff, they are particularly suitable for measuring rapidly changing forces. Thanks to the special property of the piezoelectric measuring element – almost constant measuring accuracy across a wide force range – one and the same sensor can be used for a wide spectrum of forces.

The sensor has extremely high protection against overloading, so there is no need for complex and costly protective measures when using the lower measurement ranges in each case.

The sensor's exceptionally small design makes it an excellent choice for pick & place applications. In the semiconductor sector, for example, very small breaking forces are detected for quality assurance purposes.

In conjunction with a Kistler Control Monitor, the measured forces can be recorded, evaluated and forwarded to higher-level quality management systems.



Technical data

Nominal force F_z	kN	0 ... 2.7
Calibrated range ¹⁾	kN	1.5
Maximum force	kN	3
Sensitivity, nom. ¹⁾	pC/N	-35 ±2
Sensitivity, nom. ¹⁾ with preloading set (approx. -8%)	pC/N	-32 ±2
Linearity including hysteresis ¹⁾	%FSO	±1
Repeatability	%	0.06
Preloading force	kN	1.2
Axial stiffness (calculated)	kN/μm	1.9
Lateral stiffness (calculated)	kN/μm	0.5
Shear stiffness (calculated)	kN/μm	0.6
Torsional stiffness (calculated)	Nm/°	226
Bending stiffness (calculated)	Nm/°	197
Max. bending moment ²⁾ M_x, M_y max. (single moment) ($M_z = 0$) calculated	N·m	1.4
Max. torque ²⁾ ($M_x, M_y = 0$) calculated	N·m	0.3
Temperature sensitivity, sensitivity change (-40°C ... 80°C, $T_{ref} = 23°C$)	%	4

¹⁾ With preload of 44% of nominal force

²⁾ With preloading element at preload force of 50% of nominal force

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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.

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Technical data (continuation)

Operating temperature range of sensor	°C	-40 ... 80
Insulation resistance at room temperature (@23°C)	TΩ	≥10
Connector type		KIAG 10-32 pos. BNC pos.
Min. cable bending radius, dynamic	mm	30
Min. cable bending radius, static	mm	8
Bending cycles (drag-chain, radius 30 mm)		>10 million
Degree of protection (IEC 60529)	IP	65
Weight Sensor without cable	g	3.8

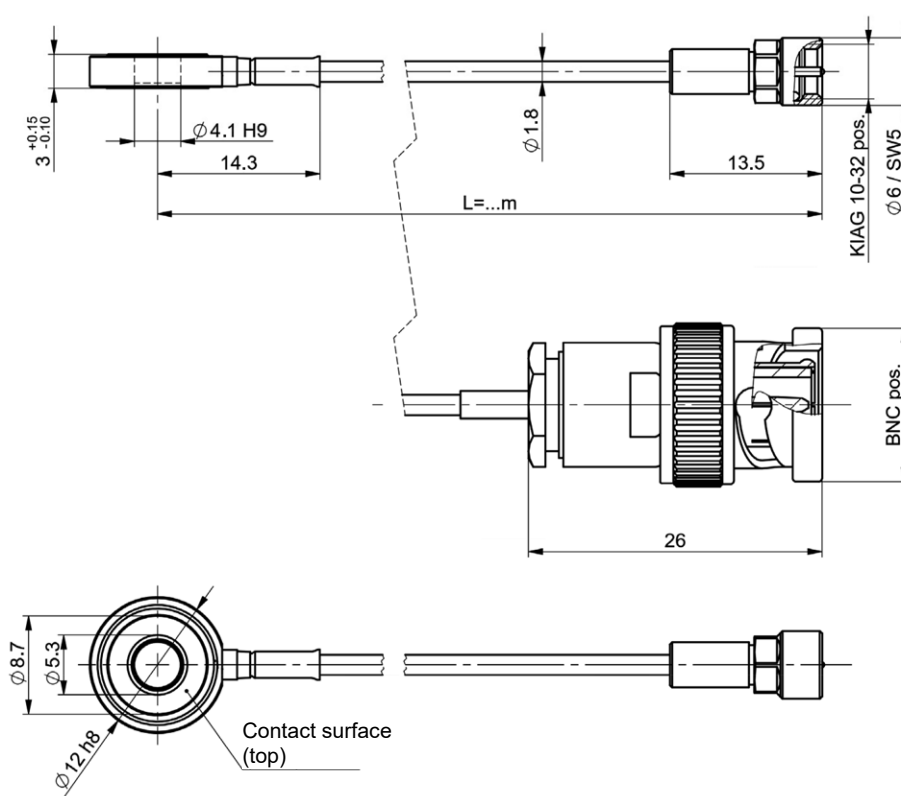
Application examples

- Measuring very small forces in the semiconductor industry (bonding)
- Intricate jointing processes in the medical sector
- Contact measurement on keys, switches and relays
- Measuring spring characteristics
- Measuring pull-out forces on plug contacts
- Constructing highly sensitive miniature measuring platforms
- Measuring forces on automatic assembly plants and robots

Installation

Please consult the data sheet for the SlimLine sensor family to obtain more information about sensor installation (direct force measurement / force measurement in shunt mode), mounting dimensions and consideration of bending moment (IMPORTANT: max. bending moment Type 9132CD... for calculation: 1.4 Nm and range limit value: 2.7 kN!).

Dimensions



9132CD_003-574e-03.23

Accessories (optional)

	Type
• Preloading disk for SlimLine Sensor Type 9132CD...	9410A2
• Coupling KIAG 10-32 neg. - KIAG 10-32-neg.	1729A

For additional information about compatible products, please visit our web page www.kistler.com/force.

For connection and extension cables, see the data sheet: Cables for force, torque and strain sensors (1631C_00-346).

For cable connectors, couplings and accessories, see the data sheet: Coaxial cable connectors (1700-00-347).

Ordering key

		Type 9132CD
Version		
KIAG 10-32 pos. with hexagonal swivel nut, SW5	1	
BNC pos.	2	
Length		
Cable length L = 3 m (standard)	1	
Cable length stated in m (L= 0.1 ... 3 m)	9	