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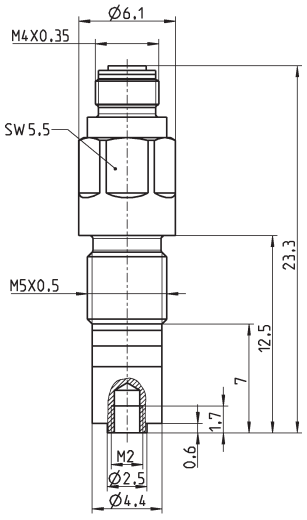
Low Level Force Sensor

Type 9215

M5x0,5, –20 … 200 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.

- 3 calibrated measuring ranges
- Dynamic measuring range 1 : 100 000
- Highly sensitive, for forces from 1 mN upwards
- For tensile and compression forces
- High allowable transverse force
- Low acceleration sensitivity
- High rigidity



Description

The highly sensitive measuring element fitted under low preload gives the sensor very high rigidity with simultaneously low transverse force sensitivity. The sensor body has an M5x0,5 external thread and a sealed, ceramic-insulated connecting plug. The force is introduced via the M2 tapped bore at the front.

Technical Data

Measuring range	F_z	N	–20 … 200
Overload	F_z	N	–30/300
Calibrated measuring ranges			
100 %	F_z	N	0 … 200
10 %	F_z	N	0 … 20
1 %	F_z	N	0 … 2
Threshold	F_z	N	$<5 \cdot 10^{-4}$
Sensitivity	F_z	pC/N	≈–81
Linearity, all measuring ranges		%FSO	≤±1,0
Hysteresis, all measuring ranges		%FSO	≤1,0
Transverse force [1], max.	$F_{x,y}$	N	90
Transverse force sensitivity	$F_{x,y} \rightarrow F_z$	N/N	≤±0,05
Transverse force sensitivity, typical		N/N	≤±0,035
Bending moment, max.	$M_{x,y}$	N·m	0,5
Sensitivity to bending moment	$M_{x,y} \rightarrow F_z$	N/N·m	≤±3
Torque, max.	M_z	N·m	1,0
Rigidity	c_z	N/µm	≈100

Natural frequency	kHz	>50
Acceleration sensitivity		
axial	N/g	$<2 \cdot 10^{-3}$
radial	N/g	$<4 \cdot 10^{-4}$
Operating temperature range	°C	–50 … 180
Temperature coefficient of sensitivity		
20 … 100 °C	%/°C	<0,05
100 … 180 °C	%/°C	<0,07
Insulation resistance, at 20 °C	Ω	$>10^{13}$
Capacitance	pF	≈15
Connector (ceramic insulator)		M4x0,35 neg.
Degree of protection (with cable connected)	EN60529	IP65
Case material	DIN	1.4542
Weight	g	2,5
Tightening torque, max.		
M5x0,5	N·m	2
M2	N·m	0,2

[1] Point of force application at tip of force introducing cap

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Application

The miniature size is ideal for installation in confined spaces. Wide range of application in product testing and for highly sensitive force measurements in research and development, or for the construction of miniature force plates and sensor arrays with ≥7,5 mm grid dimensions.

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, robots, micromanipulators etc.

Installation

Installation by means of the M5x0,5 thread with force introduced via the M2 thread (Fig. 1). The force introducing cap (Fig. 2) is used for punctiform introduction of force.

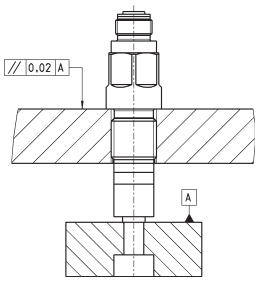

Fig. 1: Mounting with M5x0,5 thread

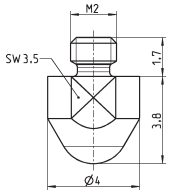

Fig. 2: Force introducing cap
Art. No. 3.220.217

Accessories Included	Art. No.
• Force introducing cap	3.220.217
• Fork wrench SW 3,5	5.210.445

Optional Accessories	Type
• Connecting cable KIAG M4x0,35 pos. – BNC pos.	
Length 1 m	1651C1
Length 2 m	1651C2
Length 5 m	1651C5
Length 10 m	1651C10
• Connecting cable KIAG M4x0,35 pos. – KIAG 10-32 pos.	
Length 1 m	1655C1
Length 2 m	1655C2
Length 5 m	1655C5

(see data sheet cables for force, torque and strain sensors 1631C_000-346)

Ordering Code	Type
• Low Level Force Sensor M5x0,5, –20 … 200 N	**9215**

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