3-Axis Force Sensor K3A125 40kN/120kN

Item number: 10161



Highlights

- Compensation matrix "s" for minimized crosstalk

The K3A 3-axis sensor is designed for measuring force in three mutually perpendicular axes. This product group has a wide measurement ranges for the forces.
The K3A 3-Axis Force Sensors are developed for the following applications:

1. Robotics,
2. Medical technology,
3. Measurements in automation technology,
4. Mounting and Assembling of Parts in Production Lines,
5. 6-Axis Force/Torque Platforms consisting of 4x K3A Sensors,
6. Research and Testing.

Calibration of 3-Axis Force Sensors – From Standard (cv) to High Precision (s)

A key characteristic of 3D force sensors is crosstalk: applying a force also triggers a measurement in the two unloaded axes. Thanks to several compensation mechanisms (mechanical and electrical), crosstalk is typically less than 3% of the nominal load. Crosstalk is reproducible and proportional to the amplitude of the applied force. By applying an additional compensation matrix, crosstalk in all axes can be reduced to a maximum of less than 1%.

By default, you receive two factory calibrations, each with two measurement points:

one **without a compensation matrix (“cv”)** and one **with extended matrix compensation (“s”)**.

For detailed proof of the sensor's linearity, you can optionally **extend the calibration to 4 or 6 measurement points:**

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Stand: 24.03.2026

- Factory calibration certificate HL/4 (4 measurement points)
- Factory calibration certificate SL/6 (6 measurement points)

This ensures your sensor is optimally calibrated to your application from the very first measurement.

Optional special version

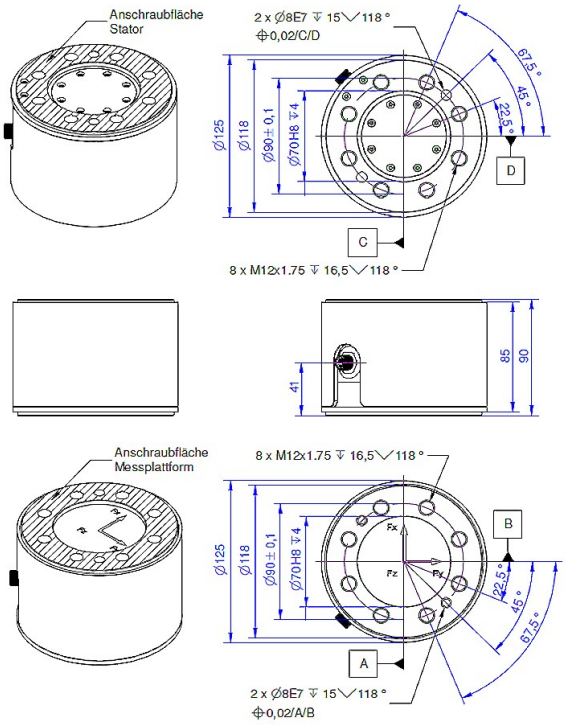
- Protection class IP68: from rated force 200 N
- Temperature range: -40°C to 180°C
- Vacuum version from 10^{-5} mbar
- Pressure range up to 8 bar
- Suitable for cleanrooms

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Technical Drawing



Technical Data

Basic Data		Unit
Type	3-axis force sensor	
Force direction	Tension/Compression	
Rated force Fx	40	kN
Rated force Fy	40	kN
Rated force Fz	120	kN
Force introduction	Internal thread	
Dimension 1	8xM12x1,75	
Sensor Fastening	Internal thread	
Dimension 2	8xM12x1,75	
Operating force	150	%FS
Material	Stahl	
Natural frequency fx	2752	Hz
Dimensions	Ø125 x 90	mm
Height	90	mm
Length or Diameter	125	mm
Torque limit	6	kNm
Bending moment limit	2	kNm
Variants	30kN/90kN, 40kN/120kN	

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Electrical Data		Unit
Rated output x-axis	1.5	mV/V / FS
Rated output y-axis	1.5	mV/V / FS
Rated output z-axis	0.8	mV/V / FS
Zero signal	0.05	mV/V
Rated range of excitation voltage from	2.5	V
Rated range of excitation voltage to	5	V
Operating range of excitation voltage from	1	V
Operating range of excitation voltage to	10	V
Input resistance x-axis	700	Ohm
Output resistance x-axis	700	Ohm
Input resistance y-axis	700	Ohm
Output resistance y-axis	700	Ohm
Input resistance z-axis	1400	Ohm
Output resistance z-axis	1400	Ohm
Insulation resistance	5	GOhm

Eccentricity and Crosstalk		Unit
Crosstalk from x to y at rated load	2	%FS
Crosstalk from y to x at rated load	2	%FS
Crosstalk from z to x/y at rated load	1	%FS
Crosstalk from x/y to z at rated load	1	%FS

Accuracy Data		Unit
Accuracy class	0,2	
Relative linearity error	0.2	%FS
Temperature effect on zero signal	0.01	%FS/K
Temperature effect on characteristic value	0.01	%RD/K
Relative creep	0.01	%FS

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Environmental Data		Unit
Rated temperature range from	-10	°C
Rated temperature range to	70	°C
Operating temperature range from	-10	°C
Operating temperature range to	85	°C
Environmental protection	IP65	

Abbreviation: RD: „Reading"; FS: „Full Scale"
The exact nominal sensitivity is indicated in the test reportCrosstalk is less than 1% when using the compensation matrix (type s).
Without using the compensation matrix, crosstalk is less than 3% (matrix type cv).

Pin Assignment

Channel	Symbol	Description	Wire color	PIN
x-axis	+Us	positive bridge supply	blue	2
	-Us	negative bridge supply	brown	1
	+Ud	positive bridge output	white	3
	-Ud	negative bridge output	green	4
y-axis	+Us	positive bridge supply	yellow	6
	-Us	negative bridge supply	pink	5
	+Ud	positive bridge output	black	7
	-Ud	negative bridge output	grey	8
z-axis	+Us	positive bridge supply	purple	10
	-Us	negative bridge supply	red	9
	+Ud	positive bridge output	grey / pink	11
	-Ud	negative bridge output	red / blue	12

Compressive load: positive output signal. Shield- transparent.

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