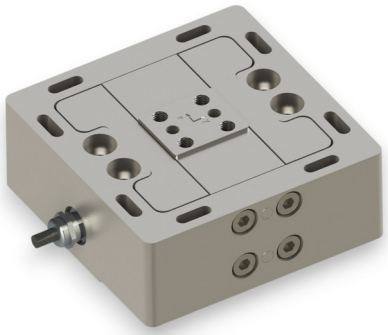
3-Axis Force Sensor K3D160 2kN

Item number: 4557



Highlights

- Compensation matrix "s" for minimized crosstalk

The 3-axis sensor **K3D160** is suitable for measuring force in three mutually perpendicular axes.

Force is applied from the 42mm x 50mm recess. A component can be installed on this surface with four M10 screws. The bottom of the sensor is fixed to the bottom with four M12 screws.

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:**

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

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Stand: 26.08.2026

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

Application areas

Areas of application are, for example, force measurement during production processes, force control in handling machines, force measurement during assembly processes, three-dimensional load measurement, measurement of friction forces.

Optional special version

- Vacuum version from 10^{-5} mbar
- Pressure range up to 8 bar

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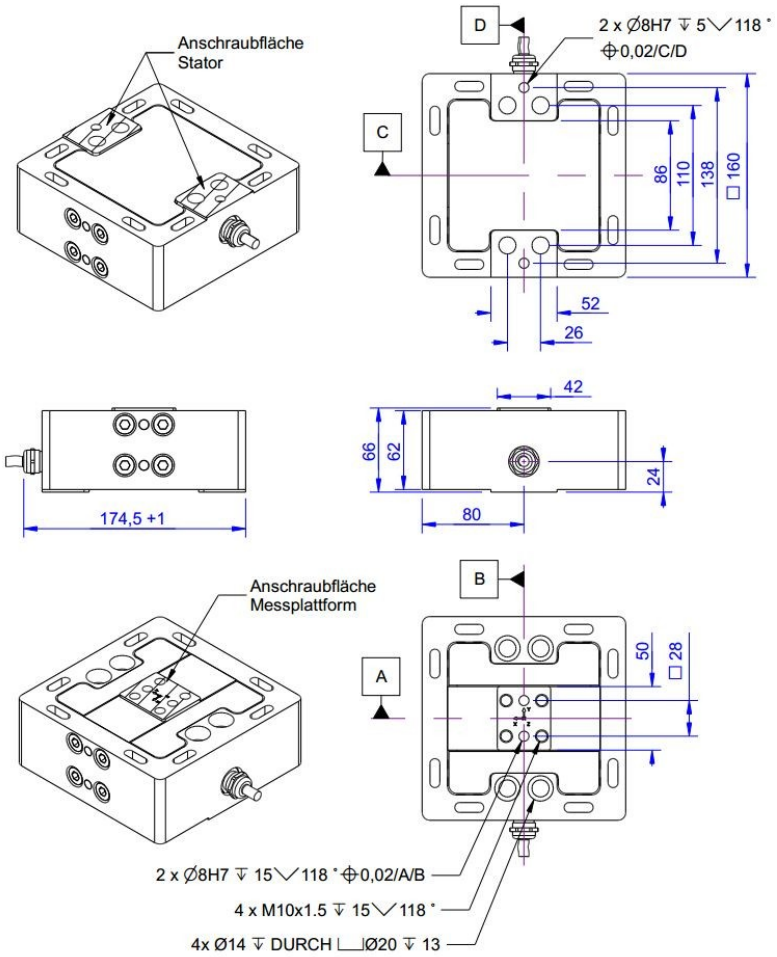
Technical Drawing



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Technical Data

Basic Data		Unit
Type	3-axis force sensor	
Force direction	Tension/Compression	
Rated force Fx	2	kN
Rated force Fy	2	kN
Rated force Fz	2	kN
Force introduction	Internal thread	
Dimension 1	4xM10	
Sensor Fastening	Through-hole	
Dimension 2	4xØ14	
Operating force	150	%FS
Rated displacement	0.08	mm
Material	tool steel	
Natural frequency fx	2	kHz
Dimensions	160 x 160 x 66	mm³
Height	66	mm
Length or Diameter	160	mm
Torque limit	1	kNm
Bending moment limit	1	kNm
Variants	2kN... 50kN	

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Electrical Data		Unit
Rated output x-axis	1	mV/V
Rated output y-axis	1	mV/V
Rated output z-axis	1	mV/V
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	740	Ohm
Output resistance x-axis	700	Ohm
Input resistance y-axis	740	Ohm
Output resistance y-axis	700	Ohm
Input resistance z-axis	740	Ohm
Output resistance z-axis	700	Ohm
Insulation resistance	5	GOhm
Tolerance input resistance	10	Ohm
Tolerance output resistance	5	Ohm

Eccentricity and Crosstalk		Unit
Allowed torque according of eccentric load	1000	Nm
Influence of eccentric load to FS	1	%FS / 500Nm
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	2	%FS
Crosstalk from x/y to z at rated load	2	%FS

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Accuracy Data		Unit
Accuracy class	0,5	
Relative linearity error	0.4	%FS
Relative zero signal hysteresis	0.1	%FS
Temperature effect on zero signal	0.02	%FS/K
Temperature effect on characteristic value	0.01	%RD/K
Relative creep	0.1	%FS

Environmental Data		Unit
Rated temperature range from	-10	°C
Rated temperature range to	50	°C
Operating temperature range from	-10	°C
Operating temperature range to	85	°C
Storage temperature range from	-10	°C
Storage temperature range to	85	°C
Environmental protection	IP67	

Abbreviation : RD: „Reading"; FS: „Full Scale"The exact nominal sensitivity is indicated in the test reportCrosstalk is less than 2% 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	sensor supply	brown	2
	-Us	sensor supply	white	1
	+Ud	bridge output	green	3
	-Ud	bridge output	yellow	4
Y-Axis	+Us	sensor supply	pink	6
	-Us	sensor supply	grey	5
	+Ud	bridge output	blue	7
	-Ud	bridge output	red	8
Z-Axis	+Us	sensor supply	purple	10
	-Us	sensor supply	black	9
	+Ud	bridge output	grey / pink	11
	-Ud	bridge output	red / blue	12

Pressure load: positive output signal.Shield- transparent.

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