3-Axis Force Sensor K3D60a 10N

Item number: 8020

The K3D60a 3-axis sensor is suitable for force measurement in three mutually perpendicular axes. This 3D force sensor is available in the measuring ranges 10 N to 500 N.

Up to a nominal load of 100 N, these sensors are made of aluminum; from a nominal load of 200 N, they are made of stainless steel.

The K3D60a 3-axis force sensor is equipped with full-bridge strain gauges. The signals from the full-bridge strain gauges each correspond to a force component in the x-, y-, and z-directions.
The vector decomposition is therefore achieved mechanically, by three orthogonally arranged spring-joint guides (double bending beams), and additionally by the arrangement of the strain gauges in the Wheatstone bridge, so that residual transverse forces and moments are also compensated electrically/circuit-wise. The three double cantilevers in this 3D force sensor are connected in series.

A key characteristic of 3D force sensors is crosstalk: The application of a force also results in a reading in the two unloaded axes. Due to multiple compensation (mechanical + electrical), crosstalk is typically less than 3% of the nominal load. The crosstalk is reproducible and proportional to the applied force amplitude. By applying an additional compensation matrix, crosstalk can be reduced to typically less than 1% in all axes.

ME-Meßsysteme therefore supplies two calibration certificates: without a compensation matrix (type "cv") and with a compensation matrix (type "s").

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Stand: 30.06.2025

Technical Data

Basic Data		Unit
Type	3-axis force sensor	
Force direction	Tension/Compression	
Force introduction	Internal thread	
Dimension 1	4x M3x0,5	
Sensor Fastening	Through-hole	
Dimension 2	2x Ø4,3	
Operating force	200	%FS
Rated displacement	0.1	mm
Natural frequency fx	1	kHz
Dimensions	60 x 60 x 25	mm³
Height	25	mm
Length or Diameter	60	mm
Torque limit	20	Nm
Bending moment limit	20	Nm
Variants	10N... 500N	

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Electrical Data		Unit
Rated output x-axis	0.5	mV/V / FS
Rated output y-axis	0.5	mV/V / FS
Rated output z-axis	0.5	mV/V / FS
Zero signal	0.1	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	395	Ohm
Output resistance x-axis	350	Ohm
Input resistance y-axis	395	Ohm
Output resistance y-axis	350	Ohm
Input resistance z-axis	395	Ohm
Output resistance z-axis	350	Ohm
Insulation resistance	5	GOhm
Tolerance input resistance	10	Ohm
Tolerance output resistance	10	Ohm

Eccentricity and Crosstalk		Unit
Influence of eccentric load to FS	1	%FS / 10Nm
Crosstalk from x to y at rated load	3	%FS
Crosstalk from y to x at rated load	3	%FS
Crosstalk from z to x/y at rated load	3	%FS
Crosstalk from x/y to z at rated load	3	%FS

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Accuracy Data		Unit
Accuracy class	0,5	
Relative linearity error	0.2	% FS
Relative zero signal hysteresis	0.02	% FS
Temperature effect on zero signal	0.02	%FS / K
Temperature effect on characteristic value	0.02	%RD/ K
Relative creep	0.1	% FS

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
Storage temperature range from	-10	°C
Storage temperature range to	85	°C
Environmental protection	IP65	

Abbreviation : RD: „Reading"; FS: „Full Scale";1) The exact rated output is reported in the test report .2) K3D60a with 370 and 390 Ohm input impedance and 350 ohm output resistance

Pin Assignment

Channel	Symbol	Description	Wire color	PIN
1	+Us	positive bridge supply	brown	
	-Us	negative bridge supply	white	
	+Ud	positive bridge output	green	
	-Ud	negative bridge output	yellow	
2	+Us	positive bridge supply	pink	
	-Us	negative bridge supply	grey	
	+Ud	positive bridge output	blue	
	-Ud	negative bridge output	red	
3	+Us	positive bridge supply	purple	
	-Us	negative bridge supply	black	
	+Ud	positive bridge output	orange	
	-Ud	negative bridge output	transparent	

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