

## 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").

## 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 $f_x$	1	kHz
Dimensions	60 x 60 x 25	mm <sup>3</sup>
Height	25	mm
Length or Diameter	60	mm
Torque limit	20	Nm
Bending moment limit	20	Nm
Variants	10N... 500N	

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

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
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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	