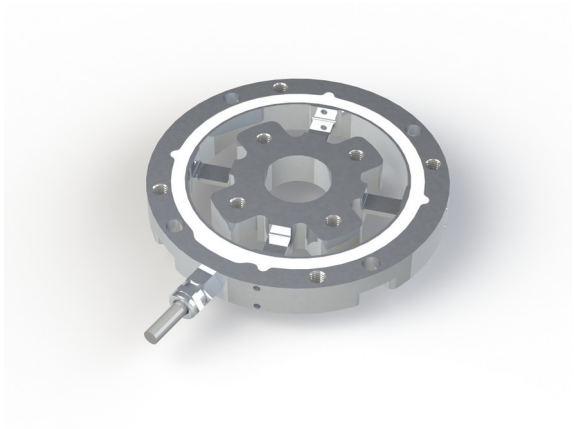
3-Axis Force Sensor K3R110 50N/1Nm

Item number: 6562



The force sensor K3R110 is very well suitable for testing tasks in the quality assurance and in the material testing due to its compact design.

This precision force sensor distinguish itself by flat construction of only 14 mm thickness.

By the sensor K3R110 the connections of 4 straing gauge measuring springs are separately brought out.

By setting the four measuring signals it is possible to determine the axial force and the bending moment Mx and My around the x- and y-axes with the sensor.

The distance of the force transmission from the sensor surface helps to set the bending moments Mx and My and also horizontal forces Fx and Fy.

With the help of calibration matrix the simple processing of the sensor signals to forces and moments will be achieved.

ME-Meßsysteme GmbH
Eduard-Maurer-Str. 9
DE-16761 Hennigsdorf

Tel: +49 (0)3302 8982 4 10
Mail: vertrieb@me-systeme.de
Web: www.me-systeme.de

Stand: 14.08.2024

Technical Data

Basic Data		Unit
Type	3-axis force sensor	
Force direction	Tension/Compression	
Rated force Fz	50	N
Force introduction	Internal thread	
Dimension 1	4x M6x1	
Sensor Fastening	Internal thread	
Dimension 2	4x M6x1	
Operating force	150	%FS
Rated displacement	0.1	mm
Material	alluminum-alloy	
Dimensions	Ø 110 x 14	mm x mm
Height	14	mm
Length or Diameter	110	mm
Rated torque Mx	1	Nm
Rated torque My	1	Nm
Torque limit	200	%
Variants	50 N... 5000N	

Electrical Data	Unit

Eccentricity and Crosstalk	Unit

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Accuracy Data		Unit
Accuracy class	0,1	
Relative linearity error	0.1	%FS
Relative zero signal hysteresis	0.1	%FS
Temperature effect on zero signal	0.01	%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	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	IP66	

Abbreviation : RD: „Reading“; FS: „Full Scale“;1) The exact rated output is reported in the test report .

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	nc	
	-Us	negative bridge supply	nc	
	+Ud	positive bridge output	gray	
	-Ud	negative bridge output	pink	
3	+Us	positive bridge supply	nc	
	-Us	negative bridge supply	nc	
	+Ud	positive bridge output	blue	
	-Ud	negative bridge output	red	
4	+Us	positive bridge supply	nc	
	-Us	negative bridge supply	nc	
	+Ud	positive bridge output	black	
	-Ud	negative bridge output	purple	

Screen - transparent. Pressure load : positive output signal; nc: not occupied

Mounting

Variant table

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Variant	50N	100N	200N	200N VA	500N VA	1000N VA
Fz in N	50	100	200	200	500	1000
Mx in Nm	1	2	4	4	10	20
My in Nm	1	2	4	4	10	20

Calibration matrix

Application as 3D Force-Torque Sensor

	Ch1	Ch2	Ch3	Ch4
Fz	+100N / 1mV/V	+100N / 1mV/V	+100N / 1mV/V	+100N / 1mV/V
Mx	0Nm / 1.5 mV/V	-2Nm / 1.5mV/V	0Nm / 1.5 mV/V	+2Nm / 1.5mV/V
My	+2Nm / 1.5mV/V	0Nm / 1.5 mV/V	-2Nm / 1.5 mV/V	0Nm / 1.5 mV/V

With the 12 elements of the calibration matrix A the relationship between the output signal U = (U1, U2, U3, U4) of the sensor and the load vector L (Fz, Mx, My) is established:

L = A x U.

Manual: http://www.me-systeme.de/docs/de/manuals/a5/ba-k6d.pdf

The measuring amplifier GSV-8 or the software GSV multi have the appropriate mathematical functions.

Application as Force / Focus Sensor

Alternatively can be calculated the focus of force transmission.

For the coordinates sx and sy (distance from center in x- and y- directions) is valid:

sx = Mx / Fz

sy = My / Fz

Application as 3D Force Sensor

If the distance sz from the sensor surface is known, the torques Mx and My can be converted into appropriate forces Fy and Fx:

Fy = Mx / sz

Fx = My / sz

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