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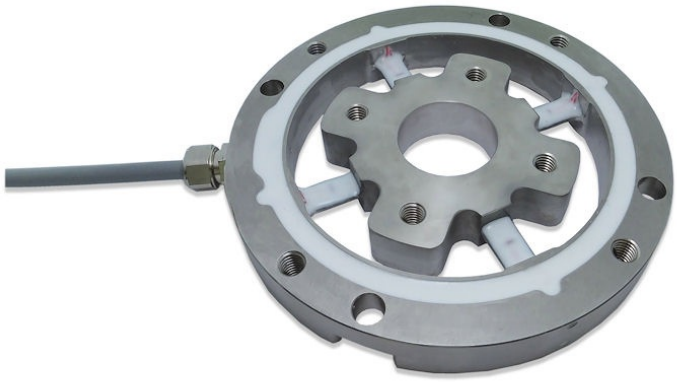
K3R110 ±200N/4Nm



Description

The force sensor K3R110 suitable because of its compact design, ideal for inspection tasks in quality assurance as well as in materials testing. This precision force sensor is characterized by flat design of only 14 mm thickness up to 20 mm thickness.

The axial force Fz and the bending moments Mx and My are calculated from the strain gage signals of the 4 cantilever springs.

With the aid of a simple calibration matrix the forces and distances can be calculated as well.

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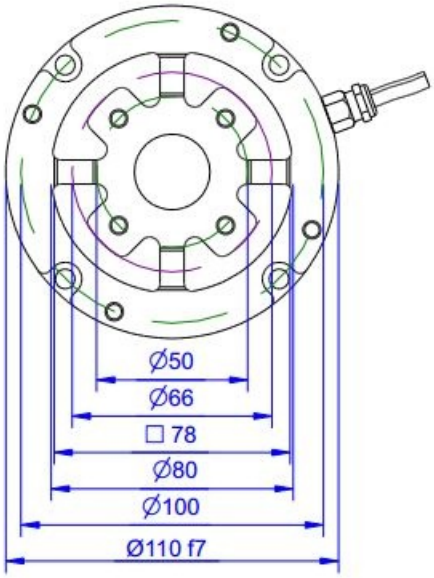
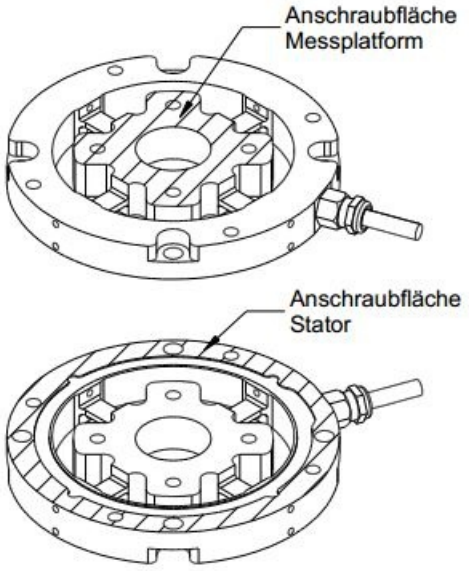
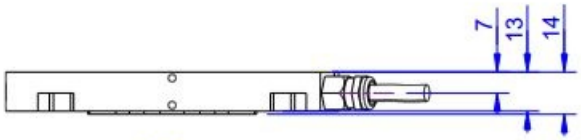
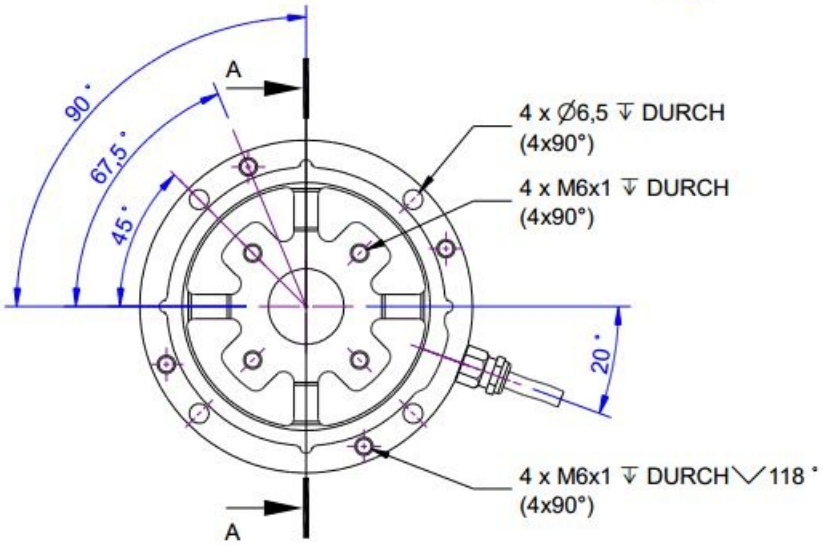
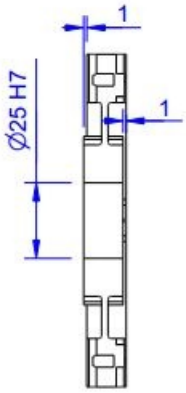
Dimensions











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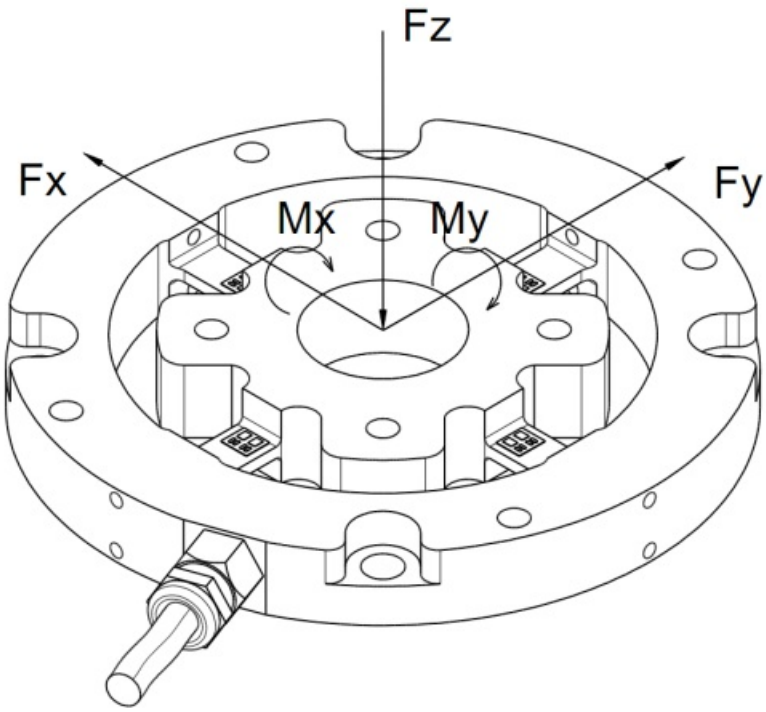

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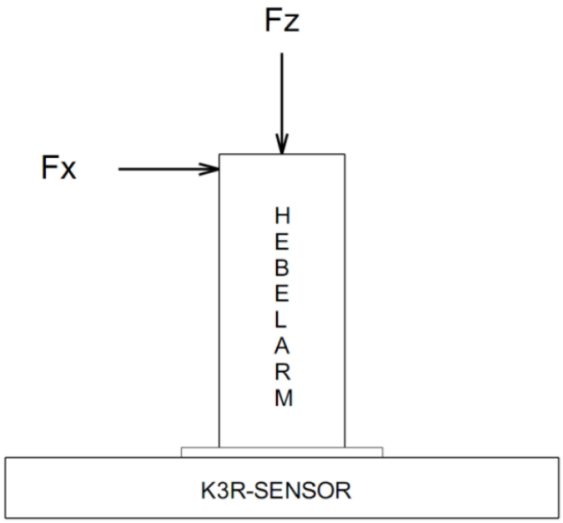
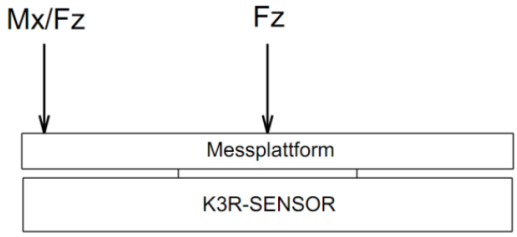


Anwendung als 3D Kraftsensor



Anwendung als Kraft - Momenten Sensor

bzw. Kraft-Schwerpunkt Sensor

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Technical Data

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

Electrical Data		
Input resistance	87	Ohm
Tolerance input resistance	2	Ohm
Output resistance	350	Ohm
Tolerance output resistance	5	Ohm
Insulation resistance	2	GOhm
Rated range of excitation voltage f	2.5 ... 5	V
Operating range of excitation voltage f	1 ... 5	V
Zero signal	0.05	mV/V
Rated output	1	mV/V / FS

Precision		
Accuracy class	0,5%	
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

Connection Data		
Connection type	10-Leiter offen	
Name of the connection	ME-SYSTEME.DE 24-10 PUR / 10x0,14	
Cable length	3	m

Temperature		
Rated temperature range f	-10 ... 70	°C

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Operating temperature range f	-10 ... 85	°C
Storage temperature range f	-10 ... 85	°C
Environmental protection	IP66	

Abbreviation : RD: „Reading“; FS: „Full Scale“;

1) The exact rated output is reported in the test report .

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Pin Configuration

Channel	Symbol	Description	Wire colour
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

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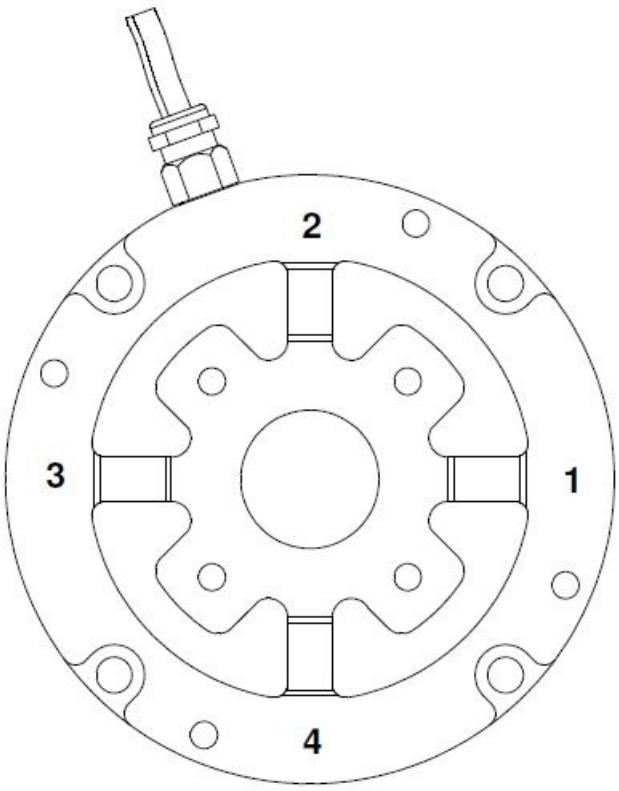

Description of channels

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Mounting

Variant table

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

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Fx = My / sz

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accessories

	Description	Description
	Configuration SubD44/m/HD	Connector Type SubD, 44 pins, male (male), with hood
	K3R-CalibrationMatrix	Calibration matrix with 12 calibration factors for scaling of the sensor output signals on forces Fz and moments Mx and My.
	GSV-8DS	8-channel amplifier with USB port, analog output, UART interface. Other versions GSV-8AS CAN with Canbus and GSV-8AS EC with EtherCAT fieldbus.

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Orderoptions

Type	Description