6-Axis Force Sensor K6D68 1kN/20Nm/CG

Item number: 4085

The K6D68 multi-component sensor is suitable for measuring force and torque in three mutually perpendicular axes.

The K6D68 force / torque sensor is characterized by compact dimensions at high forces and moments. It is eminently suitable for applications in robotics, e.g.

- collision detection
- "Teach-In"
- Presence or error detection
- Force- or torque-controlled operation
- Stress measurement in medical technology / prosthetics / orthopedic technology / gait analysis
- Measurements in sports medicine
- Comfort measurements / Ergonomic measurements
- Monitoring of joining and assembly processes

The evaluation of the load of force and torque takes place e.g. with a measuring amplifier GSV-8. With the freely available software GSVmulti the display, recording and export of the measurement results are possible. The calculation of the 6 load sizes is e.g. via a Windows DLL or via Labview using a provided digital calibration document. The calibration document contains the individual calibration factors and error corrections of the sensor. Due to the detailed documentation of the calculation instructions, the use of 6 measuring amplifiers with analogue output, e.g. GSV-1H, with subsequent billing of the measurement results possible.

The sensors K6D68 1kN / 20Nm and 2kN / 50Nm are made of an aluminum alloy with a stainless steel housing. The sensors from 5kN / 50Nm are made entirely of stainless steel.

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Stand: 28.06.2025

Technical Data

Basic Data		Unit
Type	6-axis force sensor	
Force direction	Tension/Compression	
Rated force Fx	1	kN
Rated force Fy	1	kN
Rated force Fz	2	kN
Force introduction	Innengewinde	
Dimension 1	6x M10x1,5	
Sensor Fastening	Internal thread	
Dimension 2	6x M10x1,5	
Operating force	300	%FS
Material	alluminum-alloy	
Natural frequency fx	2.3	kHz
Height	64	mm
Length or Diameter	83	mm
Rated torque Mx	20	Nm
Rated torque My	20	Nm
Rated torque Mz	20	Nm
Torque limit	140	Nm
Bending moment limit	140	Nm

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Electrical Data		Unit
Input resistance	350	Ohm
Tolerance input resistance	10	Ohm
Output resistance	350	Ohm
Tolerance output resistance	10	Ohm
Insulation resistance	2	GOhm
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	5	V
Zero signal from	-1.5	mV/V
Zero signal to	1.5	mV/V
Characteristic value range from	0.2	mV/V
Characteristic value range to	1	mV/V

Eccentricity and Crosstalk		Unit
Crosstalk	1	%FS

Accuracy Data		Unit
Accuracy class	0,2	
Relative linearity error	0.1	%FS
Relative zero signal hysteresis	0.1	%FS
Temperature effect on zero signal	0.1	%FS/K
Temperature effect on characteristic value	0.05	%RD/K
Relative creep	0.1	%FS
Relative repeatability error	0.5	%FS

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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";
The application of a calibration matrix is required for the determination of the forces Fx, Fy, Fz and moments Mx, My, and Mz from the 6 measurement channels, and to compensate for the crosstalk.
The calibration data are individually determined and documented for the sensor.
The measurement error is expressed individually by the specification of the extended measurement uncertainty (k = 2) for the forces Fx, Fy, Fz, and moments Mx, My, Mz.

PIN Assignment

Channel	Symbol	Designation	Color	PIN
1	+Us	positive bridge supply	red	
	-Us	negative bridge supply	black	
	+Ud	positive bridge output	green	
	-Ud	negative bridge output	white	
2	+Us	positive bridge supply	blue	
	-Us	negative bridge supply	yellow	
	+Ud	positive bridge output	purple	
	-Ud	negative bridge output	grey	
3	+Us	positive bridge supply	orange	
	-Us	negative bridge supply	brown	
	+Ud	positive bridge output	pink	
	-Ud	negative bridge output	transparent	
4	+Us	positive bridge supply	green-black	
	-Us	negative bridge supply	black-white	
	+Ud	positive bridge output	red-black	
	-Ud	negative bridge output	white-black	
5	+Us	positive bridge supply	purple-black	
	-Us	negative bridge supply	yellow-black	
	+Ud	positive bridge output	bue-black	
	-Ud	negative bridge output	gray-black	
6	+Us	positive bridge supply	pink-black	
	-Us	negative bridge supply	brown-black	
	+Ud	positive bridge output	orange-black	
	-Ud	negative bridge output	transparent-black	

Shield: connected with sensor housing;

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Mounting

The forces is applied to an annulus (80 - 50 mm in diameter) on the end faces of the sensor. No force is applied to the area inside the ring.

A centring hole is provided to secure the angular position.

Stiffness Matrix

23.6 kN/mm	0.0	0.0	0.0	471.1 kN	0.0
0.0	23.6 kN/mm	0.0	-471.1 kN	0.0	0.0
0.0	0.0	120.6 kN/mm	0.0	0.0	0.0
0.0	-471.1 kN	0.0	37.7 kNm	0.0	0.0
471.1 kN	0.0	0.0	0.0	37.7 kNm	0.0
0.0	0.0	0.0	0.0	0.0	22.1 kNm

- The elements with the unit kN/mm describe the relationship between force and path.
- The elements with the unit kNm describe the relationship between torque and twist.
- The elements with the unit kN describe the relationship between torque and path (columns 1 to 3) or the relationship between force and twist (columns 4 to 6)

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