6-Axis Force Sensor K6D225 100kN/15kNm

Item number: 9492



The multi-component sensor K6D225 is suitable for the simultaneous force and torque measurement in three mutually perpendicular axes.
The measuring ranges for the forces and torques can be adapted in a wide range. The K6D225 was designed for the following applications:

- Robotics
- Measurements in automation technology
- Aerospace

The force/torque sensor has 12 output channels. Each 6 channels are arranged with a robust connector of series UP13.
The 12 measuring channels can be used for the

- optimal use of measurement accuracy in the range of 0.2% and better,
- for redundant measurement with two measuring amplifiers of series GSV-8DS.

Alternatively, the force/torque transducer can be operated with 6 channels. In this case, only a measurement amplifier of series GSV 8DS is required. The measurement accuracy is up to 20% of the measuring range in each component (FX and FY).

In conjunction with the measurement amplifier GSV-8DS the 12 measuring channels are optimally synchronized in a few nanoseconds time offset. Mathematically, a 6 x 12 matrix provides optimal error compensation and best possible accuracy.

The 6 x 12 matrix can be processed with the software GSVmulti to represent the forces and torques.

When using only 6 channels or redundant measuring the complete calculation of forces, torques and error compensation are proceed in the measuring amplifier GSV-8DS and given out as an analog signal. In this case, no PC and no external software is required.

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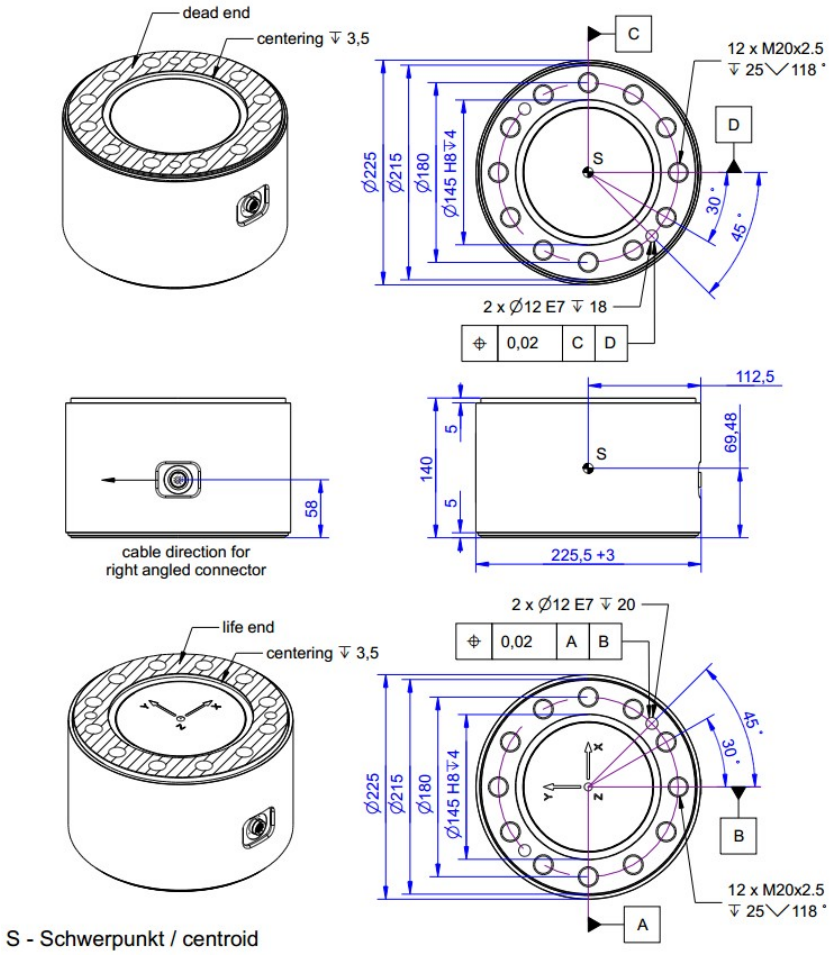
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Technical Drawing



S - Schwerpunkt / centroid

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Technical Data

Basic Data		Unit
Type	6-axis force sensor	
Force direction	Tension/Compression	
Rated force Fx	100	kN
Rated force Fy	100	kN
Rated force Fz	250	kN
Force introduction	Internal thread	
Dimension 1	12 x M20x2.5	
Sensor Fastening	Internal thread	
Dimension 2	12 x M20x2.5	
Operating force	200	%FS
Rated displacement	0.1	mm
Twist	0.01	rad
Material	Stainless steel	
Natural frequency fx	2000	Hz
Height	140	mm
Length or Diameter	225	mm
Rated torque Mx	15	kNm
Rated torque My	15	kNm
Rated torque Mz	15	kNm
Torque limit	300	%FS

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Electrical Data		Unit
Input resistance	350	Ohm
Tolerance input resistance	50	Ohm
Output resistance	350	Ohm
Tolerance output resistance	20	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	10	V
Zero signal	0.1	mV/V
Characteristic value range from	0.35	mV/V
Characteristic value range to	1	mV/V

Eccentricity and Crosstalk		Unit
Crosstalk from x to y at rated load	0.5	%FS
Crosstalk from y to x at rated load	0.5	%FS
Crosstalk from z to x/y at rated load	0.5	%FS
Crosstalk from x/y to z at rated load	0.5	%FS

Accuracy Data		Unit
Accuracy class	0,2	
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

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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 12 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 and 7	+Us	positive bridge supply	green	4
	-Us	negative bridge supply	yellow	3
	+Ud	positive bridge output	white	9
	-Ud	negative bridge output	brown	8
2 and 8	+Us	positive bridge supply	blue	10
	-Us	negative bridge supply	red	11
	+Ud	positive bridge output	gray	2
	-Ud	negative bridge output	pink	1
3 and 9	+Us	positive bridge supply	gray-pink	6
	-Us	negative bridge supply	red-blue	5
	+Ud	positive bridge output	black	12
	-Ud	negative bridge output	purple	7
4 and 10	+Us	positive bridge supply	white-yellow	23
	-Us	negative bridge supply	yellow-brown	18
	+Ud	positive bridge output	white-green	21
	-Ud	negative bridge output	brown-green	22
5 and 11	+Us	positive bridge supply	white-pink	15
	-Us	negative bridge supply	brown-pink	14
	+Ud	positive bridge output	white-gray	17
	-Ud	negative bridge output	gray-brown	16
6 and 12	+Us	positive bridge supply	white-red	20
	-Us	negative bridge supply	brown-red	24
	+Ud	positive bridge output	white-blue	13
	-Ud	negative bridge output	brown-blue	19
-	shield		transparent	

Shield: connected with sensor housing;Plug connector 1: channel 1 - 6Plug connector 2: channel 7 - 12

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Mounting

The force is applied on a circular ring Ø215 - Ø145mm on the front sides of the sensor. The surface within the Ø145mm circular ring remains unloaded.

The centering collar Ø145mm H8, 4 deep can be used for centering. A centering hole 12E7 serves to secure the angular position.

Recommended tightening torque: 580Nm;

Stiffness Matrix

849.5 kN/mm	0.0	0.0	0.0	63712 kN/rad	0.0
0.0	849.5 kN/mm	0.0	-63712 kN/rad	0.0	0.0
0.0	0.0	4058.1 kN/mm	0.0	0.0	0.0
0.0	-63712 kN/mm	0.0	19272 kNm/rad	0.0	0.0
63712 kN/mm	0.0	0.0	0.0	19272 kNm/rad	0.0
0.0	0.0	0.0	0.0	0.0	12136 kNm/rad

- 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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