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K6D80 5kN/250Nm/MP11

Description

The multi-component sensor K6D80 allows force and torque measurement in three mutually perpendicular axes.
The multi-component sensor K6D80 distinguish itself by a big measuring range for torques at the same time with the small outer diameter.
With this multi-component sensor of the „second generation“ is used rod construction, which absorbs forces and torques directly on the pitch circle of the fastening thread. Thereby, the maximum stiffness and the biggest measuring range will be achieved for the torques.
The force transmission is applied on the 1 mm raised segments. The inner diameter of segments is used for the centering. Due to segmented, ring-shaped front surface, the optimal force transmission and therefore the best possible reproducibility in the range of about 0,1 % will be obtained.
The multi-component force sensor is very well suited for use in robotics, e.g.

- For collision detection
- “Teach-In”
- Presence detection and error detection
- Force or torque-controlled operation
- Load measurement in medicine, prosthetics, orthopaedic engineering or gait analysis
- Measurement in sports medicine
- Comfort / ergonomics measurements

The force and torque loadings are evaluated e.g. using a GSV-8AS measurement amplifier or an integrated electronic of type GSV-6.
The sensor K6D80 2kN/100Nm is made of aluminium alloy, the sensor K6D80 5kN/250Nm is made of high-strength stainless steel 1.4542.

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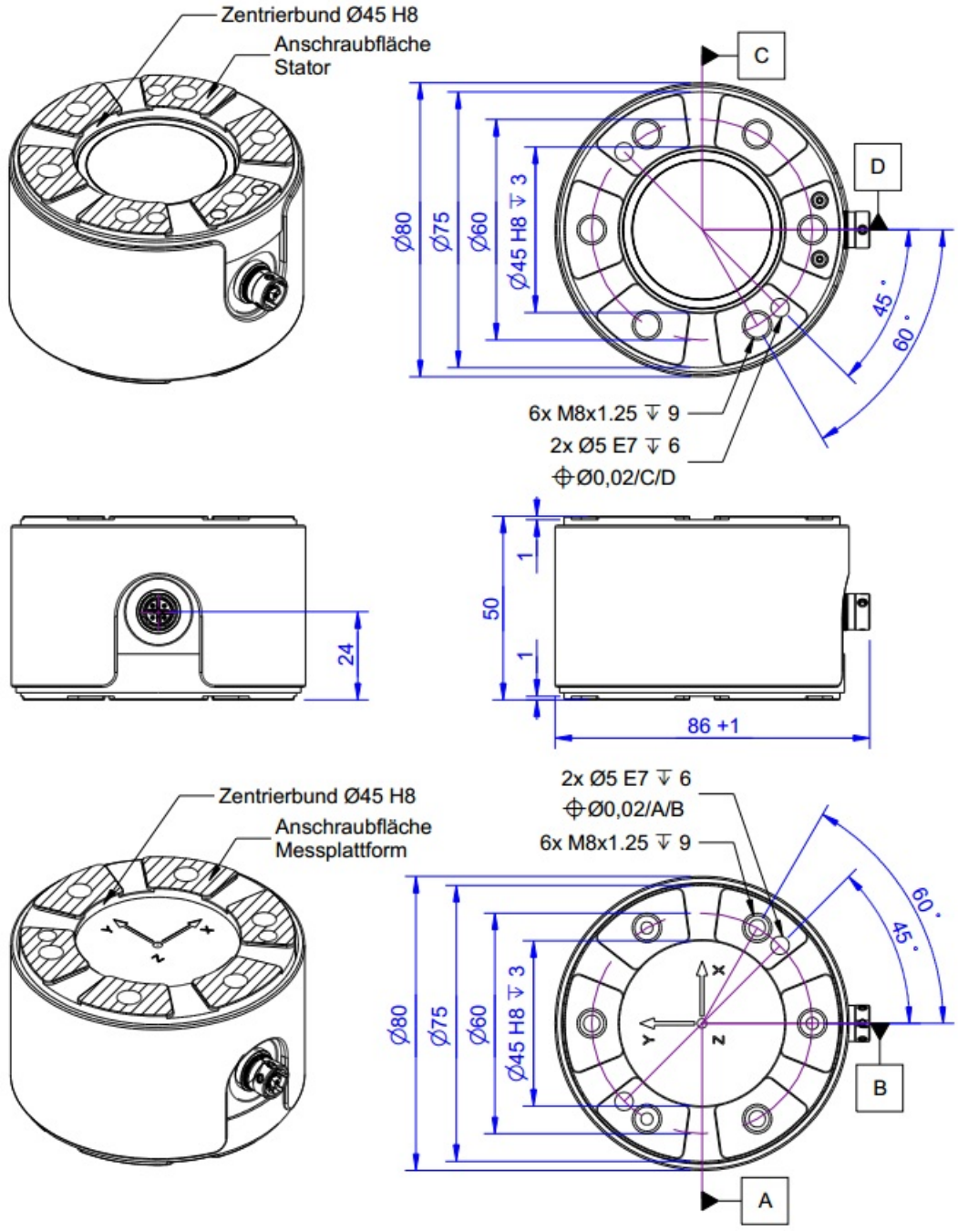
Dimensions



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Technical Data

Force sensor		
Type	6-Axis force sensor	
Force direction	Tension / Compression	
Rated force Fx	5	kN
Rated force Fy	5	kN
Rated force Fz	15	kN
Force introduction	Inner thread	
Dimension 1	6x M8x0,1,25	
Sensor Fastening	Inner thread	
Dimension 2	6x M8x0,1,25	
Operating force	300	%FS
Rated displacement	0.05	mm
Twist	0.04	rad
Material	Stainless steel	
Natural frequency	3.6	kHz
Dimensions	Ø80 x 50	mm
Height	50	mm
Length or Diameter	80	mm
Rated torque Mx	250	Nm
Rated torque My	250	Nm
Rated torque Mz	250	Nm
Torque limit	300	% FS
Bending moment limit	300	% FS
Breaking force	600	%

Electrical Data		
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 f	2.5 ... 5	V
Operating range of excitation voltage f	1 ... 5	V
Zero signal to	-0.05	mV/V
Zero signal from	0.05	mV/V
characteristic value range min	0.5	mV/V
characteristic value range max	0.8	mV/V

Precision		
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

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Relative repeatability error	0.5	%FS

Connection Data

Connection type	Connector	
Name of the connection	MP11, 24-pole, male	

Eccentricity and Crosstalk

Crosstalk	1	%FS

Temperature

Rated temperature range f	-10 ... 70	°C
Operating temperature range f	-10 ... 85	°C
Storage temperature range f	-10 ... 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.

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Pin Configuration

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

Shield: connected with sensor housing;

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Manual

Stiffness Matrix K6D80 5kN/250Nm

164.7 kN/mm	0,0	0,0	0,0	4117 kN	0,0	u_x
0,0	164.7 kN/mm	0,0	-4117 kN	0,0	0,0	u_y
0,0	0,0	712.6 kN/mm	0,0	0,0	0,0	u_z
0,0	-4117 kN	0,0	346.7 kNm	0,0	0,0	phi_x
4117 kN	0,0	0,0	0,0	346.7 kNm	0,0	phi_y
0,0	0,0	0,0	0,0	0,0	225.3 kNm	phi_z

Element	Description
[kN/mm]	force- displacement
[kNm]	torque- twist
[kN]	force- twist and torque- displacement

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Mounting

The forces is applied to an annulus (Ø75-Ø45) 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.

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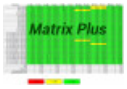
accessories

	Description	Description
	K6D-CalibrationMatrix SL	Standard calibration matrix "Small load" for the sensors with small measuring ranges
	K6D-CalibrationMatrix SL/Plus	High accuracy calibration matrix for 6-axis force/torque sensors;
	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.
	GSV-8AS	8-channel amplifier with USB port, analog output, UART interface. Other versions GSV-8AS CAN with Canbus and GSV-8AS EC with EtherCAT fieldbus.
	K6D-Adapter Development	Indicative offer for an adapter set, Consisting of e.g. 2 plates, For mounting a device / flange on K6D sensor;
	Connection cable MP11/f-M16/24p/m	Connection cable for the K6D sensor to 8-channel measuring amplifier GSV-8AS
	Connection cable MP11/f-M16/24p/m/angled	Angled connection cable for the K6D sensor to 8-channel measuring amplifier GSV-8AS
	Connection cable MP11/f-D-Sub44HD/m	Connection cable for connecting the K6D sensor to an 8-channel measuring amplifier GSV-8DS SubD44HD
	Connection cable MP11/f-D-Sub44HD/m/straight	Straight connection cable for connecting the K6D sensor to an 8-channel measuring amplifier GSV-8DS SubD44HD
	Connection cable MP11/f-D-Sub44HD/m/angled	Angled connection cable for connecting the K6D sensor to an 8-channel measuring amplifier GSV-8DS SubD44HD
	Connection cable MP11/f-open end	Connection cable for K6D sensor